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WEED ABSTRACTS

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NOTES FOR READERS

Weed Abstracts endeavours to provide a comprehensive coverage of the world's literature on weeds, weed control and closely allied subjects. To this end, over 370 journals and nearly 100 annual reports are regularly searched. Other journals, reports, bulletins, etc. are abstracted as they are seen. Additional coverage is obtained through agreements with other abstracting organisations.

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As far as possible the journal abbreviations used are those given in the World List of Scientific Periodicals. Holding libraries in Oxford and elsewhere are also taken from the World List, e.g. O.BO. = Botany Department, Oxford. Numbers at the end of abstracts e.g. 75(492) are for internal use only.

When a paper is by more than one author, the address of the first author only is given.

Where an abstract is taken from an abstracting journal the acknowledgement follows the abstract, e.g. Herb.Abstr., 2,163. Where it is quoted only in part the acknowledgement is preceded by the word "from", e.g. From Biol.Abstr., 2,294.

The Information Section is always pleased to receive comments and suggestions for the improvement of Weed Abstracts.

* An asterisk before the author's name indicates that only the title of the paper has been seen.

Continued from the inside back cover.

ac	- acre(s)	in.	- inch(es)	p.s.i.	- pounds per square inch
a.e.	- acid equivalent	kg	- kilogram(s)	v/v	- volume/volume
a.i.	- active ingredient	l	- litre(s)	w/v	- weight/volume
cm	- centimetre(s)	lb	- pound(s)	w/w	- weight/weight
d.b.h.	- diameter at breast height	m	- metre(s)	>	- greater than
		ml	- millilitre(s)	<	- less than
ft	- foot(feet)	oz	- ounce(s)	#	- pounds per acre
g	- gram(s)	post-em.	- post-emergence	±	- with or without
gal	- gallon(s)	pre-em.	- pre-emergence		
ha	- hectare(s)	p.p.m.	- parts per million		

Language abbreviations: an initial capital denotes the language of the article, a small letter that of the summary:- Dan.- Danish, Du. - Dutch, E. - English, F. - French, G. - German, It. - Italian, Jap. - Japanese, Nor. - Norwegian, Russ. - Russian, Span. - Spanish, Sw. - Swedish.

See also 57, 58, 63, 148.

1. SHAW, W.C. (U.S.Dep.Agric., Beltsville, Maryland, U.S.A.) Know your limiting factors in crop production. Publ.Amer. Potash Inst., (n.d.). pp.41.
A section entitled "How weeds can reduce yields and quality" is contributed by W.C. Shaw. Competition between crops and weeds is reviewed briefly and methods of weed control in which a combination of herbicidal and cultural techniques are used are outlined. - P.J.B. [O.W.]

2. S.I.A.P.A. (Societa Italo Americana Prodotti Antiparassitari). Il diserbo invernale del frumento. Erbitox Giallo. [Winter weed control in wheat. Erbitox Giallo.] Lotta antiparassitaria, 1960, 12, (11), 10-11.
Recommends, inter alia, a 1% solution of Erbitox Giallo [DNOC (ammonium) 50%] for the control of Cuscuta in lucerne at least 1 year old. - D.M.L.S. [O.W.]

3. HOLLY, K. (A.R.C.Weed Res.Org., Begbroke Hill, Oxford, England). Pot experiments with new herbicides for the control of wild oats. Proc.5th Brit. Weed Control Conf., 1960, pp.6, figs.3, tabs.2, bibl.5.
In a trial in 1959, barban was applied to Avena fatua at the 2-leaf stage and to Proctor barley at the same growth stage, but with the tip of the 3rd leaf visible. Volumes were adjusted to give a range of 6.2 to 47.5 gal/ac. while rates of barban were held constant at 1 #. Barley consistently retained more spray than A. fatua. The amount of spray retained was lowest at the 47.5 gal spray rate. Barban at 0.5 and 1 # reduced the growth of both species at 4 weeks after treatment; volume rates had little effect on their reaction to barban, though the 0.25 # treatment tended to have least effect at the 47.5 gal spray rate. Plant kill at 4.5 months after treatment was greatest for the lowest spray volumes and it was considered that low volume treatments would enable increased economy of herbicides to be made. Different surface active agents added to barban gave small increases in spray retention and phytotoxicity, but had no useful effect on selectivity. In trials in which wheat, barley and A. fatua were treated at the 1- to 5-leaf stages with barban at 0.5, 1 and 2 #, wheat showed virtually no reaction, A. fatua was most susceptible at the 2- to 2.5-leaf stage and barley at the 3- to 5-leaf stages. The effect of depth of sowing wheat, barley and A. fatua on their subsequent reaction to barban was not clear, though some increased tolerance was bestowed on wheat by drilling it 2 in. deep. Reducing the intensity of the light received by A. fatua plants to 24 and 50% of full daylight from the time of emergence until assessments were made 4 weeks after spraying, increased their susceptibility to barban applied at the 1.5- to 1.75-leaf stage; reducing light intensity only after spraying did not affect the reaction to barban. Applications of 0.1 mg barban/plant by means of a microsyringe reduced shoot growth by 15 and 36% when made to the tip of the second and first leaf blades, respectively, and by 62 and 61% when made to the base of the first leaf and the outside of the sheath of the first leaf. Barban at 0.19, 0.38 and 0.75# applied to the soil surface after sowing S124 red clover, S100 white clover, Provence lucerne, S47 cocksfoot and S22 Lolium multiflorum, followed by the equivalent of 0.17 in. rainfall, had no effect on the growth of any species. In a pot trial with 2,3-dichloroallyl diisopropylthiolcarbamate, rates of 0.25, 0.5, 1 and 2 # were incorporated in a 3 in. depth of soil, immediately followed by sowing Atle and Koga II wheat, Proctor and Rika barley, A. fatua and A. ludoviciana. Wheat and barley emergence showed little or no reduction, while both Avena spp. showed marked and virtually identical reductions in emergence. Selectivity between Avena spp. and cereals seemed greater with this herbicide than with barban. The residual effect of the thiolcarbamate on A. fatua in moist soil in pots was still great after 3.5 weeks; in another pot trial, rates of 0.56 # in moist soil still retained enough activity to restrict the growth of A. fatua to $<$ 10% of that of controls. There was a slight increase in spray retention and phytotoxicity from dinoseb where this was applied at the 2-leaf stage after the thiolcarbamate. Sugar beet, kale, peas, field beans, maize, lucerne, white clover and red clover all tolerated rates of 2 # incorporated into the soil immediately before sowing. Most grasses were susceptible and could be ranked as follows in order of decreasing resistance: Poa annua, cocksfoot, Alopecurus myosuroides, timothy, Lolium multiflorum. - P.J.B. [O.W.]

4. EVANS, S.A. (A.R.C.Weed Res.Org., Begbroke Hill, Oxford, England). The control of wild oats (Avena fatua) with barban and 2,3-dichloroallyl diisopropylthiolcarbamate. Proc.5th

rit.Weed Control Conf., 1960 pp.5, tabs.1, ibl.1.
In 14 trials barley, spring wheat and winter heat were treated with barban at 4 and 8 z/ac at the 1.5-2-leaf stage and at the -leaf stage of the wild oats, with or ithout MCPA at 24 oz a.e./ac applied at the econd date. In 4 out of 7 trials with arley, no visible effects of the treatments ere noted. In the rest of the barley and he spring wheat trials, treatments checked he crop; this being greatest for early pplications at high dose rates. MCPA and mecoprop in 1 trial) had little visible nfluence on the effect of barban. Yields f Proctor barley were depressed in one rial especially after the early treatments. ith winter wheat all, and particularly the ate, treatments checked the crop; MCPA in ombination with barban 8 oz increased the amage, this was the only treatment to esult in a marked yield decline. Treatment f Avena fatua at the earlier growth stage n nearly every case resulted in better ontrol than at the later stage and at the arlier date of application, the higher dose ate gave the best results. In similar trials ith peas, no visible crop damage was noted. n a trial with spring beans, rates of 8, 12 and 16 oz applied at the 2-leaf stage of A. fatua gave 58, 67 and 79% control espectively and yields were nearly trebled in each case. Avadex (2,3-dichlorallyl-diisopropylthiolcarbamate) was applied to Rika and Proctor barley at 0.75, 1, 1.5, 2, 3 and 6 # and was incorporated on the same day. Rates of 0.75 and 1 # caused no crop damage; response to higher rates was variable. A rate of 1.5 # checked the crop in half the trials, but gave 80-100% control of A. fatua in every trial but one at harvest time. In general, control of A. fatua tended to be more consistent with Avadex than with barban. P.J.B. [O.W.]

5. HOLROYD, J. (A.R.C.Weed Res.Org., Begbroke Hill, Oxford, England). The use of barban for the control of Avena fatua. Proc. 5th Brit.Weed Control Conf., 1960, pp.6, bibl.11.
In 4 yield trials in 1960 in A. fatua-free spring wheat and spring barley, barban at 4, 8 and 12 oz/ac in 13.4 gal spray was applied when the crop had approximately 3 and approximately 5 leaves. Rika barley and Koga II and Jufy wheat were unaffected by rates up to 12 oz/ac at the 3-leaf stage. Applications at the 5-leaf stage checked the growth of Koga II wheat, especially at the 12 oz rate, but Jufy wheat and Rika barley were little affected. In 2 trials on spring barley and 2 on spring wheat on soil infested with A. fatua, the results conclusively showed the sensitivity to barban of A. fatua treated at the 1- to 3-leaf stage. A. fatua treated with 4 and 8 oz barban suffered a reduction in total spikelet numbers of 40-66% and 70% respectively and the reduction in numbers of panicles standing above the crop was still better (76-85% for the 4 oz treatment). Barban applied at 8 oz/ac when the number of A. fatua plants at the 1- to 3-leaf stage had dropped to ca. 55% reduced spikelet numbers by 13-42%. Wheat and barley were resistant to barban at the 3-leaf stage, but tended to become less resistant at later growth stages, especially in the case of wheat. MCPA triethanolamine at 1.5 # a.e. applied when the crop had 5 leaves showed no antagonistic effect on barban applied 7 days earlier. MCPA applied at the same time as barban reduced its effectiveness and increased its toxicity to the cereals. The need to asses the total number of spikelets produced, rather than merely the number of panicles above the crop as an index of the effectiveness of barban is stressed. — P.J.B. [O.W.]

6. PFEIFFER, R.H. and PHILLIPS, J. The effect of barban on the yield of winter wheat, spring wheat and barley. Proc.5th Brit.Weed Control Conf., 1960, pp.5, figs.2, tabs.6.
In 3 trials, Avena fatua-free winter wheat and winter barley were treated on 4 dates between December, 1959 and April, 1960 with 2, 4, 6 and 8 oz/ac. No visual effects on winter barley were noted, or on winter wheat except for the treatment in mid-March, when a rate as low as 4 oz reduced subsequent yields. This indicated that winter wheat passed through a phase of sensitivity to barban in March. In 5 trials in which barban at 4 oz/ac was applied to winter wheat infested with A. fatua in the winter of 1959/60, best crop yields and control of A. fatua were given by treatments between November and March, but not later. In similar trials with winter wheat heavily infested with A. ludoviciana treatment with 4 oz/ac in winter and March markedly increased yields; the toxicity of the March treatment was greatly outweighed by the yield increases resulting from the elimination of A. ludoviciana. In a trial in which barban at 4 oz/ac was applied to winter

wheat infested with Alopecurus myosuroides in November (1- to 1.5-leaf stage), December (2.25- to 3-leaf stage) and March, good control was given by the November and December treatments, but not by the March treatment. Highest yields with spring barley were given by treatments when the A. fatua was in the 1- to 1.5-leaf stage, though control of A. fatua was slightly better when treated at the 1.5- to 2.5-leaf stage. In a trial in which barley was treated with barban at 6 oz/ac at 3 day intervals over a period of 1 month, grain yields were increased by 20-30% at 7 out of 10 application dates, though control of A. fatua reached a level of 80% at only 1 date of treatment. - P.J.B. [O.W.]

7. PFEIFFER, R.K., BAKER, C. and HOLMES, H.H. (Chesterford Park Res.Sta., Saffron Walden, Essex, England). Factors affecting the selectivity of barban for the control of Avena fatua in wheat and barley. Proc.5th Brit.Weed Control Conf., 1960, pp.11, figs.4, tabs.5, bibl.2.

Investigations in the very dry year of 1960 showed that in that year, 75-79% of wild oats emerged during a relatively short period and contributed 95% of the total seed formed. Plants emerging after the main flush showed a marked reduction in spikelet numbers per plant, which was ascribed to crop competition. In field trials, barban at 4 oz/ac was applied to spring wheat in 5 trials and at 6 oz to spring barley in 5 trials at 3-day intervals over a 1 month period. The results showed that barban should be applied when the main flush of wild oats had emerged, but before many had passed the 2.5-leaf stage. The spraying period over which $\geq$80% control of wild oats was secured was $>$20 days in 2 trials, 15-19 days in 2 trials, 10-14 days in 4 and $<$10 days in 2 trials out of 10. In experiments on crop competition and barban dosage in relation to control of wild oats, increasing the seed rate of barley from 0.75 to 6 bushels/ac progressively reduced the weight of oat plants/yd^2 from ca. 700 to 100 g and where barban was also applied, from ca, 400 to 100 g respectively; where no barley was sown, weights of wild oats plants were, respectively, ca. 1400 and 400 g, without and with barban treatment. The capacities of barley and barban to reduce wild oat numbers appeared to be separate and additive; rates of barban which caused crop damage, even when only temporary, resulted in heavier wild oat infestation at harvest than where lower, but completely safe, rates were used. In 24 trials in 1959, control of wild oats was best at rates of 4 and 8 oz/ac. In varietal trials with barley, Proctor showed considerably lower level of tolerance to barban than Carlsberg, Rika, Ymer, Herta and some Swedish 6-row varieties. Further trials in 1960 indicated that barley varieties could be placed in 3 categories of tolerance as follows: (a) low tolerance, Provost, Proctor, Freja and Plumage Archer, (b) medium tolerance, Earl, Rika, Spratt Archer, Maythorpe and (c) high tolerance, Carlsberg II. Tentative placings for other varieties were: (a) Domen, (b) Ingrid Pallas, Nordgarden, Hillmarsh, Delta, Hafnia, Arva Kenia, Haisa II, Gateway, Kenia, Gazelle, Volla, Herta, Vada and Ymer, (c) Elsa, Swallow, Uunion, Topper, Pioneer. Dosage response curves for Proctor and wild oats were almost identical.

In field trials with 6 winter wheat, no conclusive evidence of varietal differences were found. Applying 2,4-D or 2,3,6-TBA at up to 4 days before applying barban reduced its effectiveness; applying the 2,4-D and 2,3,6-TBA after barban had no effect. In further trials 2,3,6-TBA/MCPA was the most strongly antagonistic to barban, followed by mecoprop and MCPA. A commercial formulation of MCPB containing a small amount of MCPA did not antagonise barban and no herbicide had any antagonistic effect when applied 1 week after the barban. Applications of barban in 90 gal/ac resulted in much reduced effectiveness compared with 3.3, 10 and 30 gal; rates of 10-30 gal were regarded as best. Sprays applied vertically and at an angle of 45° showed no difference in effect. Split applications of barban (standard rate split into 2 applications at 1 and 2 week intervals) showed no consistent advantage over a single application. - P.J.B. [O.W.]

8. JONES, A.J. (Chesterford Park Res.Sta., Saffron Walden, Essex, England). Field results on the reliability of barban for the control of wild oats in cereals. Proc.5th Brit. Weed Control Conf., 1960, pp.5, figs.4, tabs.3, bibl.1.

The reliability of barban under practical conditions was assessed in 84 field trials during 1960, including development trials, ground and aircraft applications and farmer trials. In 16 trials in which rates of 4, 6, 8 and 12 oz barban/ac were applied to spring barley and spring wheat when 70-80% of the A. fatua was at the 1.5- to 2.5-leaf

stage, control of A. fatua was better in spring wheat than in spring barley at any dosage level used, which was attributed to the greater competition to A. fatua offered by spring wheat. In 18 trials, A. fatua control averaged 86%. Mean control of A. fatua in 60 farmer trials was 60% and 79% where trials in which inaccurate applications were used were not included. - P.J.B. [O.W.]

9. HOLROYD, J. (A.R.C.Weed Res.Org., Begbroke Hill, Oxford, England). Some preliminary experiments with 2,3-dichlorallyl diisopropylthiolcarbamate. Proc.5th Brit. Weed Control Conf., 1960, pp. 6, tabs.2, bibl.1.

The results are given of 3 trials with spring wheat and 5 with spring barley on sites carrying different populations of Avena fatua. Avadex (2,3-dichloroallyl diisopropylthiolcarbamate) was used at rates of 0.5, 1 and 2 # a.i., discs or harrows were used to incorporate the herbicide immediately after application and sowing took place 1 to 20 days later. The optimum dose rate of Avadex was 1-2 #; A. fatua spikelet numbers were reduced by 85-99% at 4 sites by 2 # and on 2 sites by 1 #. The 2 # rate slightly reduced the density of barley sown 4 days after application, while stands, vigour and yield of wheat were still more adversely affected. The removal of A. fatua competition at a level of 100 and 50 panicles/yd^2 resulted in yield increases of 10 cwt/ac (74%) and 3.3 cwt/ac (21%), respectively. The importance of soil texture, method of incorporation and other factors on the effectiveness of Avadex is discussed. - P.J.B. [O.W.]

10. HANNAH, L.H., HALL, P.C. and SELLECK, G.W. (Monsanto Chem.Co., St.Louis, Missouri, U.S.A.) The performance of 2,3-dichloroallyl diisopropylthiolcarbamate in the wild oat areas of North America. Proc. 5th Brit.Weed Control Conf., 1960, pp. 4.

The results of trials in N. America on the use of Avadex (2,3-dichloroallyl diisopropylthiolcarbamate) for the control of wild oats are reviewed. At a rate of 1.5 #, Avadex is said to have consistently given 90-99% control of wild oats under both experimental and farm conditions. Wheat appears to be the least tolerant crop grown in the areas where wild oats are a problem. Concentrations of 0.7, 0.35, 0.23 and 0.175 p.p.m. Avadex in soil resulted in 82, 59, 0.6 and 0.2% average inhibition of wheat (3 varieties) and 99, 99, 96 and 69% inhibition of wild oats. Wild oats were controlled when only the coleoptile was in contact with lethal amounts of Avadex. Wheat appears to be relatively resistant if its roots are in untreated soil. Flax, barley, sugar beet, lentil, peas, sunflower, safflower, rapeseed, potato, lucerne, clovers, Poa pratensis and Dactylis glomerata all showed satisfactory tolerance to Avadex at rates sufficient to give good control of wild oat. Wheat treated with Avadex at 1-1.5 # is unharmed when sown in soil into which Avadex is incorporated to depths not greater than 2 in.; rates greater than 1.5 # increase the degree of control of wild oat only slightly. No residues of Avadex have been detected in mature plants harvested from plots treated with amounts as high as 6 #. - P.J.B. [O.W.]

11. HUGHES, R.G. (N.A.A.S., S.E.Region, Coley Park, Reading, Berks, England). Pre-emergence and post-emergence weed control in maize. Proc.5th Brit.Weed Control Conf., 1960, pp.9, tabs.7, bibl.2.

In trials in 1959 and 1960 in Berkshire on Upper Greensand soil (35% clay, 11% coarse sand, 32% fine sand, 5.4% organic matter), simazine was applied overall, pre-em. to maize at rates of 3-0.375 # in 28 gal spray with a logarithmic sprayer immediately after sowing. In 1959 conditions were dry after spraying (7th May) and visible effects of the herbicide were not evident until late June. In 1960, conditions were more favourable than in 1959 and clear differences in herbicidal effect were noted at early growth stages of the weeds. Weed growth in both years was assessed in mid-June and weeds were classified according to the amount of simazine required to give complete control, as follows: 2.5-3 # for Rumex obtusifolius and Agropyron repens, 2-2.5 # for Polygonum aviculare, P. convolvulus, Galium aparine, Cirsium arvense, Thlaspi arvense, Hypochaeris radicata, 1.5-2 # for Chenopodium album, Urtica urens, Fumaria officinalis, Solanum nigrum, Ranunculus repens, 1-1.5 # for Sinapis arvensis, Raphanus raphanistrum, Myosotis arvensis. In post-em. trials at 2 locations in 1960 with (a) MCPA potassium salt, (b) 2,4-D triethanolamine and (c) 2,4-D butoxy ethyl ester applied post-em. at 1 location on 30th May and 13th June and on 16th June at the other location at rates of 3-0.375 # with a logarithmic sprayer, at the location where

the application was made on 16th June, Chenopodium album was absent or moribund where (a), (b) and (c) were applied at rates of >12, > 8 and > 6 oz/ac, respectively. Thlaspi arvense was controlled by all rates above 6 oz/ac, Veronica agrestis was killed by (c) at > 16 oz/ac and Matricaria maritima by (a), (b) and (c) at 24, 16 and 12 oz/ac. At the other location, the second spraying date gave the best weed control. Growth arrest of all weeds, with failure to flower, was caused by (a), (b) and (c) applied at 16, 16 and 8 oz/ac at the second date. In the simazine trials, the importance of applying the herbicide immediately after sowing and before rolling the seedbed was noted.

The cost of simazine at 1.5 # was amply covered by a fodder yield response of 1.6 tons dry matter/ac in 1960. The trials with MCPA and 2,4-D indicated that where weeds susceptible to these were present, their use was profitable and that there was little to choose between MCPA and 2,4-D amine where these were applied before the 6-leaf stage of the maize. - P.J.B. [O.W.]

12. LAST, F.T. (Gezira Res.Sta.,Wad Medani,Sudan). Incidence of Striga hermonthica (Del.) Benth. on two varieties of irrigated sorghum differently manured, spaced and thinned. Trop.Agric. Trin., 1960, 37,(4),309-19, figs.4,tabs. 4,bibl.19.

Foliage of S. hermonthica growing on sorghum varieties Dwarf Hegari and Feterita 1931 grew at different rates at different stages of sorghum development and reached a peak of ca. 5.4 lb/ac/day from 65-80 days after planting. It was less developed on Dwarf Hegari than on Feterita. Adding 80 lb nitrogen (N)/ac as sulphate of ammonia increased grain and straw yields but decreased the total aerial growth of S. hermonthica from a mean (for the 2 varieties) of 245 lb in unmanured crops to 98 lb/ac. The decreases were relatively smaller from 51-80 days after sowing sorghum, when S. hermonthica was developing rapidly, than at other stages of the host's growth. Straw yields of unmanured crops of both varieties were similar at ca. 3350 lb/ac, but Dwarf Hegari yielded more grain. Adding 80 lb N/ac increased straw yields of the long-strawed Feterita to 9000 lb and of the short-strawed Dwarf Hegari to 7350 lb/ac; it increased mean grain yields of both varieties similarly, from 760 to 3540 lb/ac.

Widening the spaces between hills from 25 to 100 cm and thinning the number of plants/hill from 8 to 2 did not affect the yields of grain/ac but quadrupled the yields/plant of both varieties; the straw yields/plant increased by a factor of ca. x 3.2 instead of x 4, with consequent significant decreases/ac. Yields of grain/ac were the same over the whole range of plant populations given by combinations of the various spacing and thinning treatments, viz. 10 000 to 160 000 plants/ac, but straw yields increased progressively with increasing plant number.

In the first 7 weeks after sowing, spacing affected weights of S. hermonthica/ac, but not weights/host - less S. hermonthica grew per ac on widely than on closely spaced crops of both varieties. Later, more S. hermonthica developed per host spaced at 50 and 100 than at 25 cm, so masking the earlier effects/ac; the increases on Dwarf Hegari were less than on Feterita.

From the start, 4 times as much S. hermonthica grew per host where there were 2 instead of 8 plants/hole and as a result the weights/ac were unaffected. - Author's Summary. [O.RE.]

13. BULLEN, E.R. and HUGHES, R.G. NAAS/ARC trials on simazine in field beans. Proc.5th Brit.Weed Control Conf. 1960, pp.9, tabs.7, bibl.3.

In trials during 1959-60, mostly on clay loam or heavy loam soils, simazine was applied pre-em. as a 50 w/w wettable powder at (in most cases) 0.5, 1 and 2 # a.i. in 20 gal spray to winter-sown field beans (Vicia faba) at 4 locations and to spring-sown field beans at 6 locations. Rates of 0.5 # at some locations gave the highest yields; higher rates improved weed control, but this was not always reflected in increased bean yields. The highest rates used tended to reduce yields at most locations. Alopecurus myosuroides was markedly reduced by the 1 # rate at all locations; control of Avena fatua was only moderately effective. - P.J.B. [O.W.]

14. GREGORY, D. (Fisons Pest Control Ltd., Chesterford Park, nr. Saffron Walden,Essex, England). The use of simazine on winter sown field beans. Proc.5th Brit.Weed Control Conf. 1960, pp.11, tabs.8,bibl.6.

In 15 trials during the 1959/60 season on a wide range of soil types applications of simazine 0.5, 1 and 2 # were made in early winter (between 4th November and 1st December) pre-em. to field beans (Vicia faba) in 10

trials and post-em. at the same rates in spring (between 4th and 18th March) in 5 trials. The early winter treatments were applied as soon as possible after the beans were sown. Following the early-winter treatments, control of Avena fatua ranged from 79-100% and was best on chalky soils and worst on heavy clay soils; spring treatments were relatively ineffective against this weed. On heavy clay and chalk marl soils, simazine 0.5 # applied in winter gave >90% control of Alopecurus myosuroides, but only 54% control on light loam; following spring treatment with simazine 0.5 #, control on the heavy clay was only 31%, compared with 85% on the light loam. These results are discussed in relation to the amount of winter precipitation. Volunteer barley and wheat plants were controlled best by winter treatments, but annual broad-leaved weeds (except Galium aparine) by spring treatments. Rates greater than 1 # caused damage to the beans in many cases and this was consistently greater following winter than spring treatment and on light rather than heavy soils. Significant yield increases of beans followed the elimination of A. myosuroides where infestation by this weed was heavy; on light soils, the highest rate of simazine applied in winter or spring reduced yields significantly. On heavy clay soils in the absence of heavy weed infestation, only the highest rate of simazine applied in winter reduced yields significantly. - P.J.B. [O.W.]

15. WELDON, L.W. and TIMMONS, F.L. (Wyoming Agric.Exp.Sta., Laramie, Wyoming, U.S.A.) Chemical control of annual weeds in dry field beans. Circ.Wyo.agric.Exp. Sta., 1959, pp.9, tabs.4.

Experiments carried out in 1955-8 in Wyoming showed the possibility of satisfactory chemical weed control in dry field beans. All experiments were carried out on furrow-irrigated soils of different types, with consequent marked variations in crop and weed response to treatment. Chlorpropham 6 # injured beans on light soils, when heavy rain followed application, but not on heavy soils. EPTC and CDEC 4.5 # was 40% more effective when incorporated into the soil surface. Dinoseb, neburon and diuron at 4 # were not aided by soil-incorporation though rainfall immediately after their application increased their effectiveness. Results in general indicate EPTC and CDEC as giving, in most cases, the best results. Dinoseb and neburon at 6 # also proved satisfactory under certain conditions. 3,4-DMB (3,4-dimethylbenzophenone) was tested in 1957 at 8 and 16 #, but results were inconclusive. - P.C. [19(78.7)]

16. COWAN, W.T. and BREESE, T.C. (Farm Protection Ltd., England). CIPC/diuron mixtures for pre-emergence weed control in peas, beans and bulbs. Proc.5th Brit.Weed Control Conf., 1960, pp.5, tabs.2, bibl.1.

In trials with spring-sown peas, broad beans [Vicia faba] and field beans [Vicia faba], pre-em. treatments with chlorpropham/diuron mixture (80% of a 32 oz technical chlorpropham + 8 oz diuron mixture per Imp.gal) applied at 4 pints/100 gal water/ac 48 hours after sowing, gave satisfactory weed control in most cases, though results were variable on heavy soils especially in the dry, cold conditions of this season. Under marginal conditions weeds which showed most tolerance were Fumaria officinalis, Veronica spp. and Senecio vulgaris, though good control of these was obtained in favourable conditions. Consistently good control of Matricaria spp., Anthemis spp., Polygonum aviculare, P. convolvulus, P. persicaria, Stellaria media, Poa annua, Papaver spp. and Capsella bursa-pastoris. On relatively light soils, rates of 3 pints/ac caused no apparent crop damage. Residual toxicity was apparently caused in 3 cases where susceptible catch crops were sown after preceding pea crops sown and treated 16 weeks previously. On heavy soils and for early-sown peas, rates higher than those used in these trials were considered necessary. With narcissus, daffodil, bulbous iris and tulip, 2 applications each of 1 gal mixture in 100 gal water were made, the first immediately after planting on new beds, or after late-summer cleaning on established beds and the second as close to crop emergence as possible. Consistently good weed control, without crop damage, was obtained. Similar rates were applied to gladiolus immediately after planting and again after emergence. Weed control was excellent, though crop damage occurred in 1 case of late, post-emergence treatment. P.J.B. [O.W.]

17. GREAT BRITAIN. PEA GROWING RESEARCH ORGANISATION LIMITED. Weed control. Rep.Pea Growing Res.Org., Ltd.1959, 1960, 11.

In trials on loam, silty loam and peaty loam soils with marrowfat peas, the following herbicides (rates as a.i. in 50 gal spray) showed promise against both Avena fatua and broad-leaved weeds: (a) pre-sowing.

propham (as miscible concentrate or wettable powder) 6 #, propham 4 # + fenuron 0.25 # (as wettable powder), chlorpropham 2 # + fenuron 0.25 # (as white emulsion concentrate); (b) pre-em. atrazine 1 and 2 #, simazine 1 and 2 #. The following pre-em. treatments were effective against broad-leaved weeds, only: propham (as miscible concentrate) 6 #, propham 2 and 4 # + fenuron 0.125 and 0.25 # (wettable powder), chlorpropham 2 and 4 # (miscible concentrate), chlorpropham 2 # + fenuron 0.5 # (miscible concentrate), chlorpropham 1 and 2 # + fenuron 0.125 and 0.25 # (white emulsion concentrate), fenuron 1 # (wettable powder), propazine 1 and 2 #, trietazine 1 and 2 # and amiben triethylamine salt 4 and 8 #. No treatment was as effective against A. fatua as the recommended rate of propham wettable powder 3 #. The results of 5 small-scale trials indicated that propham 3 # should be applied at least 4 days before sowing. No post-emergence treatment was as effective as dinoseb amine. - P.J.B. [O.W.]

18. REYNOLDS, J.D. (Pea Growing Res. Org., Yaxley, Peterborough, England). Reaction of pea varieties to commonly used herbicides. Proc.5th Brit.Weed Control Conf. 1960, pp.11, tabs.7, bibl.10.

In trials during 1958 and 1960, 8 herbicidal treatments were applied to peas at rates higher than those recommended to determine the reaction of different varieties. Herbicides and rates used were: (a) TCA pre-sowing at 9.4 # in 40 gal spra (b) TCA pre-sowing at 9.4 # in 40 gal, followed by dinoseb NH_4 post-em. at 2.4 # in 50 gal, (c) propham pre-sowing at 4.5 # in 40 gal, (d) chlorpropham 3 # + fenuron pre-em. at 0.75 # in 45 gal, (e) chlorpropham 1.3 # +diuron pre-em. at 0.27 # in 40 gal, (f) dinoseb NH_4 post-em. at 2.4 # in 50 gal. and 1.7 # in 100 gal, (g) dinoseb amine post-em. at 2.4 # in 50 gal and 3.4 # in 100 gal, (h) MCPB 3 # and 2.7 # in 20 gal. Varieties used were: for vining green, Dark Skin Perfection, Gregory's Surprise, Kelvedon Wonder, Lincoln, Meteor, Onward (1958), Perfected Freezer (1960), Thomas Laxton, Victory Freezer (1958) and Witham Wonder (tall strain); for harvesting dry, Big Ben (1960), Pauli (1960), Rondo (1958) and Zelka (1958). TCA pre-em. induced most loss of bloom in Big Ben, Lincoln, Pauli and Zelka and retarded growth most in Big Ben, Lincoln and Perfected Freezer. MCPB caused yield reduction in Dark Skin Perfection, Kelvedon Wonder, Meteor and Perfected Freezer. Stem distortion was greatest in Gregory's Surprise and Thomas Laxton, but yields were not significantly reduced. Differences in maturity ratings between MCPB-treated and clean weeded peas were not significant. With dinoseb, most scorch was caused in Gregory's Surprise, Thomas Laxton, Dark Skin Perfection and Witham Wonder. The marrow-fat and blue varieties were least susceptible. TCA and dinoseb increased leaf loss by about 10%. Propham, chlorpropham + fenuron and chlorpropham + diuron had no adverse effect on any variety, did not delay emergence and no varietal differences in response were noted. No herbicide treatment affected rate of maturation. A table gives a classification of all varieties according to herbicidal response. - P.J.B. [O.W.]

19. ARMSBY, W.A. and REYNOLDS, J.D. (Pea Growing Res.Org., Yaxley, Peterborough, England). Experiments on the control of wild oats in peas: progress report, 1959-60. Proc.5th Brit.Weed Control Conf. 1960, pp.9, tabs.4, bibl.7.

In 4 trials in 1959, propham wettable powder at 3 and 6 # a.i. in 50 gal water was applied and peas sown at intervals of approximately 0, 2, 6, 10 and 14 days later. The results indicated that to minimize risk of poor pea germination, sowing should be delayed for 6-14 days after applying propham. In post-em. trials in 1959, the following were applied: atrazine, MH, fenac, dalapon, dimethylthiourea and in 1960, barban, atrazine and amiben. Only barban gave promising results for the control of wild oats. - P.J.B. [O.W.]

20. MURANT, A.F. and CUSSANS, G.W. (Norfolk Agric.Exp.Sta., Sprowston, Norwich, England). Pre-emergence weed control in sugar beet: experiments in 1959 and 1960. Proc.5th Brit. Weed Control Conf.1960, pp.14, figs.3, tabs.5, bibl.3.

In trials at 7 locations in 1959, endothal 4, 6 or 9 #, mixtures of endothal 3, 4.5 or 6 # + propham at 3, 4.5 or 4.5 # respectively, and OMU (cyclo octyl dimethylurea) at 0.5 or 0.62 # + BiPC (butinol chlorophenyl carbamate) 0.34 or 0.43 # were applied pre-em. to sugar beet. Endothal 9 # and the 2 higher rates of endothal + propham reduced sugar beet plant populations in some cases. Endothal and endothal + propham had little effect against Atriplex patula and Chenopodium album at any rate, OMU + BiPC gave relatively better, but still incomplete control of these species, but was inferior against a number of others. In one trial, endothal + propham gave fair control of Avena fatua when not incorporated into the soil. Soil type did not appear to

influence the action of these herbicides in previous trials in 1958; in 1959 there was, however, some correlation between phytotoxicity to crop and weed and the contents of organic matter and clay in the soil. The OMU/BiPC treatment appeared to be more influenced by rainfall than were the other herbicides. In trials in 1960 at 28 locations, mixtures of endothal at 6.75 or 3 # with propham at 5.06 or 2.25 # and OMU at 0.5 # with BiPC at 0.34 # were used. Weed control was, in general, good at the higher rate of endothal + propham, while OMU + BiPC was inferior to the lower rate of endothal + propham. In this year, rainfall appeared to be more important than soil type in determining the phytotoxicity of endothal + propham. It was thought that the lower rate of endothal + propham would be safe to use on all sites and that it would give sufficiently good control of weed on soils low in clay or organic matter and where rainfall was not exceptionally deficient. - P.J.B. [O.W.]

21. BAGNALL, B.H., CALDICOTT, J.J.B. and HUNTER, D.J. (Murphy Chem.Co., Wheathampstead, St.Albans, Herts., England). Field trials with endothal/propham for the control of seedling weeds in sugar beet. Proc.5th Brit.Weed Control Conf., 1960, pp.8, tabs.3, bibl.3.

In 21 trials in East Anglia on a wide range of soils, mixtures of endothal + propham in the ratio of 4 parts (a.e.) endothal to 3 of propham were applied in a band 7 in. wide immediately behind the drill unit of a sugar beet drill. Rates of 2, 4 or 6 lb endothal in mixtures with 1.5, 3 or 4.5 lb propham were used, about 7 gal spray/ac was used and weed and crop counts were made immediately before thinning. Two rates of herbicidal mixture were used at each location, the 2 higher rates on soils with more than 17% clay and the 2 lower rates on those with less than 17% clay. Band applications were as effective as overall treatments. Weed control was considered reasonably good at most locations up to the time of thinning, though control of Chenopodium album and Stellaria media was unsatisfactory in some cases where low rates of herbicide were used. Deficiency in rainfall in late April markedly reduced herbicidal effectiveness and showed that reliable results could only be expected where a reasonable amount of rain fell between sowing and emergence of the sugar beet. The desirability of investigating the effect of incorporating the herbicide into the soil surface is stressed. - P.J.B. [O.W.]

22. COOMBE, A. and DUNDAS, J. (Chilean Nitrate Agric.Serv.) Post-emergence nitrate of soda sprays for combined nitrogenous fertilization and weed control in sugar beet. Proc.5th Brit.Weed Control Conf., 1960, pp.6, tabs.1, bibl.11.

The results of a number of investigations in Europe are reviewed. It is concluded that effective weed control is given by the post-em. application of 2.5-3 cwt nitrate of soda in 65-100 gal water + spreader/ac. Best results follow treatment of plants with not more than 2 true leaves, with weeds in the cotyledon or small-rosette stage, under favourable growing conditions, with at least 24 hours dry weather after treatment. Weed control of >60% is usual. - P.J.B. [O.W.]

23. PRYTHERCH, E.I. and TOULSON, G.A. (N.A.A.S., Trawscoed, Aberystwyth, Wales). Application of herbicides in conjunction with precision drilling in kale, turnips and swedes. Proc.5th Brit.Weed Control Conf.1960, pp.6, bibl.2.

In trials at 5 locations in Wales with kale and at 2 with turnips during 1956-58, a precision drill was used to sow the crops on the ridge into a weedy seedbed on which weeds ranged from the cotyledon to the 4-leaf stage of development. Applications of PCP at 1.5-2 or 3-4 # a.e. in 40 gal water at 25 p.s.i. were made 1 to 4 days after sowing. The herbicide destroyed weed growth even at comparatively advanced stages of growth and assessments made 14-21 days after sowing showed substantial reductions in weed growth, which were significant at 4 out of 7 locations; also, weeds which had emerged at this time (the traditional time of singling) were at a very early growth stage. In 14 comparisons, yields at harvest were significantly higher in sprayed than unsprayed plots. The physical obstruction caused by weeds when drilling seed into weedy seedbeds was considerable and it was shown that spraying at up to 3 days before drilling was a more effective practice than spraying after drilling. The use of contact herbicides for seedbed treatment, in combination with precision drilling, almost completely eliminated hand labour. In preliminary trials, the use of diquat in combination with precision drilling showed promise. - P.J.B. [O.W.]

24. ROBERTSON, I.M. (Nat.Inst.Agric. Engng.Scottish Sta., Howden, Mid Calder, Midlothian, Scotland). The use of herbicidal

sprays on the potato crop. Proc.5th Brit. Weed Control Conf.1960, pp.3, tabs.1, bibl.4.

In trials during 1958-60, a mixture of dinoseb (NH_4 salt) 6 # + TCA (sodium salt) 10 # in 40 gal spray was applied as soon as a few leaves of the potato plants were visible. Weeds were entirely eliminated, except for a few Agropyron repens plants visible at harvest. No taint was detectable in the tubers. Mixtures of MCPA 2.5 # + TCA 10 # used in 1958 were relatively ineffective. In 1959, a mixture of diquat 2 # + TCA (sodium salt) 10 # gave excellent control of all weeds. In the 1959 trials, yields of tubers on soils of normal tilth where 6 inter-row cultivations were carried out averaged 13 tons/ac, compared with 13.2 tons for plots treated with herbicides and receiving no inter-row tillage; on plots on which a fine tilth was produced by a rototiller, respective yields were 15 and 15.1 tons/ac. In 1960, yields of Epicure receiving 9 tractor operations averaged 10.5 tons/ac, compared with 11.9 tons/ac for plots receiving spray treatments and no inter-row tillage. In trials with an elevator potato digger, the ratio of clods to tubers was approximately 2 to 3 for conventional tillage practices, and 2 to 9 where rotary cultivation and spraying was practiced. - P.J.B.

[O.W.]

25. WOOD, C.A., SUTHERLAND, J.P. and STEPHENS, R.J. (Scottish Hort.Res.Sta., Mylnefield, Invergowrie, Dundee, Scotland). Trials of chemical weedkillers in potatoes Proc.5th Brit.Weed Control Conf.1960, pp.5 tabs.1, bibl.6.

In trials in 1959, dinoseb amine 6 # + dalapon 2.5 # in 40 gal spray applied just before potato emergence gave almost complete kill of weeds. Few seedlings developed later and no significant yield decreases were noted. In the very dry conditions of this year, 2,4-DES 3.6 # + propham 4 # and 2,4-DES 3.6 # + fenuron 0.5 # were both ineffective against weeds and significantly reduced crop yields. In screening trials in 1959, atrazine at 2 and 3 # 17 days after planting and propazine and trietazine at 2 and 3 # 36 days after planting gave good weed control with no apparent crop damage. In trials in 1960, dinoseb 6 # with or without TCA or dalapon again gave good control of weeds which had germinated after planting, but no residual herbicide treatments were effective in the dry conditions of this year; as in 1959, the soil was dry at the time of spraying and little rain fell for several weeks after treatment. There was some evidence of herbicidal taint, especially where simazine was applied. - P.J.B.

[O.W.]

26. LYSENKO, T.D. [Laureates of Lenin prizes. Outstanding breeders - Micurinists.] Agrobiologia, 1959, 3,323-4, (Russ.)

A Lenin prize has been awarded to Pustovoit for breeding sunflowers resistant to Orobanche and with double the oil content of the older varieties. - From Plant Breed.Abstr., 30,(4), 3689. - D.M.L.S.

27. REYNOLDS, J.D. and ARMSBY, W.A. (Pea Res.Sta., Yaxley, Peterborough, England). Residual herbicide experiments on peas, 1959-60. Tech.Memo.Pea Grow.Res.Org., 1960, 5, pp.33.

In trials on different soil types during 1959-60, 21 herbicides were tested for their effectiveness as residual pre-sowing and pre-em. treatments for the control of Avena fatua and broad-leaved weeds. Of pre-sowing treatments, none exceeded propham (wettable powder) 3 # in effectiveness against A. fatua; rates of 6 # and propham 4 # + fenuron 0.25 # gave improved kill of A. fatua and broad-leaved weeds, but caused some crop injury, though this may have been associated with the short interval (2-4 days) between application and sowing. For equal rates of active ingredient a miscible concentrate formulation of propham was equal to a wettable powder formulation in effectiveness. Simazine, atrazine, propazine at 1-2 # were very effective against broad-leaved weeds, but not against A. fatua, and caused severe damage to the peas at some locations. 2,3-dichloroallyl diisopropylthiolcarbamate 2 #, EPTC 6 # and chlorpropham 4 # all gave satisfactory control of A. fatua, though the latter injured the crop. No pre-em. treatment gave consistently good results under the variable soil type and other conditions of these trials. Amiben 8 # and simazine and atrazine 1-2 # effectively controlled A. fatua, and also gave good control of broad-leaved weeds. Propazine and trietazine 2 #, fenuron 1 #, neburon 4 # and propham 6 # were all effective against broad-leaved weeds, only, and caused no crop injury. - P.C.

[448(42)]

28. BAKER, H.K. (Grassland Res.Sta., Hurley,Berks.,England). Permanent grassland in England. Pap.read at 8th Internat. Grassl.Congr. 1960, pp.6, figs.2,tabs.2, bibl.19.
The results are presented and discussed of 3 successive surveys of permanent grassland in England during the past 20 years, with details of the major types of grassland and their proportion of the total. - P.J.B. [O.W.]

29. van SLIJKEN, A. and ANDRIES, A. (Govt.Plant Breed.Sta.,Lemberge,Belgium). A comparative study of different methods for grassland improvement. Pap.read at 8th Internat.Grassl.Congr. 1960, pp.3, tabs.3.
Results are given of 2 trials in Belgium in 1954 with 4 methods of grassland improvement, (a) surface cultivation and reseeding, (b) ploughing and reseeding, (c) inorganic fertilisation and (d) organic + inorganic fertilisation. Plots were rotationally grazed after treatment. Marked changes in botanical composition took place only where the old sward was destroyed. Where fertilisers were applied without oversowing, Agrostis stolonifera, Holcus lanatus and Anthoxanthum odoratum persisted. - P.J.B. [O.W.]

30. KIRCHNER, H.-A. (Inst.für Phytopath. Pflanzensch.,Univ.Rostock,E.Germany). Bericht über die Arbeit der Sektion für chemische Unkrautbekämpfung bei der IX Internationalen Pflanzenschutzkonference im Moskau 1958. [Report on the work of the chemical plant protection section of the 9th International Conference on plant protection. Moscow 1958.] Proc.Weed Conf. zent.biol.Inst.Berlin, 1959, 109-112, (G.russ.e.)
The importance of weed biology and ecology in any planned scheme of weed eradication is stressed; it was possible to change a meadow flora completely in 3 years by continued use of the same herbicide, indicating the need for a frequent change of growth regulator; the efficacy of the latter were increased by the addition of liquid fertilisers. - P.C. [O.W.]

31. BAKER, H.K., JONES, L. and CHARD, J.R.A. (Grassland Res.Inst.,Hurley,Berks.,England). The control of weeds by MCPA in permanent pasture under different managements and the effects on herbage productivity. Proc. 5th Brit.Weed Control Conf. 1960, pp.5, tabs.3,bibl.4.
The results are given of trials on 2 sites on old, permanent pasture in the Thames Valley. On the first site, treatments were as follows: (a) no spray, no N, (b) no spray, 104 lb N/ac, (c) 24 oz MCPA a.e./ac in 22 gal water in early May, no N, (d) sprayed as (c) plus 104 lb N/ac. Treatments on the second site were the same as for the first, but two managements, continuous and rotational grazing, were imposed over each treatment. The first site was treated in 1957. As assessed in 1959, MCPA treatments reduced Ranunculus spp. and this was accompanied by increases in grass yields. Applying N alone produced the highest total herbage yields in 1959 because of increases in grasses and weeds, the latter of which comprised >20% of the total mid-season herbage production. It was considered that such increases in weediness would eventually result in sward deterioration. Yields were similar whether or not N was applied and were considerably lower than on plots given nitrogen only. On the second site, the treatments were applied in 1959. At 12 months after treatment, the frequency of Ranunculus repens and R. acris was drastically reduced by MCPA the frequency of Trifolium repens was 50-70% of that of the controls, while the frequency of T. pratense was unaffected. Clover yields during the second year after spraying showed considerable improvement, and the frequency of dicotyledonous weeds other than Ranunculus spp. also began to increase from the negligible levels of the first year after spraying. Spraying alone tended to reduce herbage yields. The major effect of N alone was to increase grass yields and there was a reduction in the frequency of clover and Ranunculus spp. and an increase in Cirsium arvense. The combination of N + MCPA always resulted in a very grassy sward with little clover and few weeds. Yields were high where N + MCPA was applied, though there were exceptions to this, as was noted in the trials on the first site. It was concluded that combinations of N + herbicides were the best means of controlling weeds in permanent pastures, but that any such measures should be accompanied by adequate pasture utilization. P.J.B. [O.W.]

32. JEATER, R.S.L. (I.C.I.,Ltd.,Jealott's Hill Res.Sta.,Bracknell,Berks.,England). Effect of growth-regulating weedkillers on the botanical composition and productivity

of permanent grassland. Monogr.Soc.chem. Indust., (n.d.), 9,125-32, tabs.6,bibl.2.
In trials in 1956 and '57, two permanent pastures infested with Ranunculus repens and two infested with Cirsium arvense were treated in the spring of 1956 with the following in 19 gal spray: MCPA K salt at 12 and 24 oz/ac a.e., MCPB sodium salt and 2,4-DB K salt at 24, 30 and 36 oz a.e./ac. The botanical composition of the swards was assessed at monthly intervals throughout the growing season and productivity was assessed by taking 2 cuts per annum during 1956 and '57 at about the silage stage of growth. On both types of sward, the herbicidal treatments considerably reduced percentages of weed and increased those of grass; total herbage yields were not affected. Clover stands were almost eliminated by taking only 2 cuts per year. - P.J.B. [492(42)]

33. ELLIOTT, J.G. (A.R.C.Weed Res.Org., Begbroke Hill,Oxford,England). The evaluation of herbicidal activity on a mixed sward. Pap.read at 8th Internat. Grassl.Congr.1960, pp.5, figs.3,tabs.2, bibl.6.
The sequence of events following the application of herbicides to mixed pastures is reviewed and data are given of changes over a 12 week period in the cover of di- and monocotyledonous plants on a Thames flood meadow in 1959 following the application of atrazine + amitrole cacodylic acid, dalapon + 2,4-D amine and of dalapon + 2,4-D, followed by diquat 2 weeks later. The implications of these findings for practical techniques of herbicidal sward destruction are briefly discussed and the results of a sward destruction trial in 1958 on a washland (subject to repeated winter flooding) sward in Cambridgeshire are given. The original sward had a cover of 65% Deschampsia caespitosa, 15% Agropyron repens, 15% Agrostis stolonifera, 2% Phragmites communis and 3% miscellaneous weeds. On 6th October, 1958, the following were applied in 28.8 gal spray volume/ac: (a) dalapon 6.1 # + amitrole 1.2 # + 2,4-D ester 1.2 # and (b) dalapon 12.2 # + amitrole 1.2 # + 2,4-D ester 1.2 #. Plots were closed until the following spring. On 8th April, 1960, no living vegetation remained on any treated plots. In each treated plot, 4 different herbage seeds mixtures were sown, with a 5th strip left unsown to regenerate naturally. On the latter, the treatments appeared to be highly lethal to D. caespitosa, but sub-lethal to A. repens and A. stolonifera. The sown herbage grasses established well and comprised a substantial proportion of the vegetation by the following October, though Cirsium arvense, Senecio aquaticus and Taraxacum officinale were also abundant. The subsequent reaction of the sown species to flooding is not known. A. repens and A. stolonifera have high grazing value on this type of washland and it was thought that swards based on these 2 species may be best adapted to such conditions. - P.J.B. [O.W.]

34. TESAR, M.B. (Michigan State Univ., E.Lansing,Michigan,U.S.A.) Recent advances in forage crop establishment. Proc.4th Ann. Farm Seed Indust.Res.Conf., 1959, 30-40, tabs.5.
The use of herbicides for seedbed preparation before sowing forage crops is discussed. In trials in N. Michigan, applications of TCA 20 # in mid-April to an Agropyron repens sward ploughed in mid-May and sown 1 week later, resulted in excellent establishment of Lotus corniculatus and the hay contained only 9% A. repens compared with 72% for an area similarly treated, but with no herbicide. At present in N. Michigan, TCA is being used on low-value land for the production of L. corniculatus seed at a land preparation cost of $10 (excluding ploughing), which is more economic than the 12-15 tillage operations otherwise needed to control A. repens. For inter-row sowings in maize, applications of neburon or dalapon [rate not given] at the time maize was sown in mid May in wide rows, followed by drilling lucerne in the first week of June, resulted in excellent stands of lucerne. In trials in which the use of herbicides for replacing the companion crop of oats (grown for the purpose of suppressing weeds) in lucerne sowings, applications of neburon and dalapon [rate not stated] when the lucerne was sown in April resulted in effective control of broad-leaved and grass weeds; hay yields were 2.54 tons/ac during the year of establishment. - P.J.B. [81(77.4)]

35. MURPHY, W.E. (Agric.Inst.,Johnstown Castle,Wexford,Republic of Ireland). Ecological changes induced in moorland pastures by different fertilizer treatments. Pap. read at 8th Internat.Grassl.Congr.1960, pp.4, tabs.3,bibl.7.
The results are given of 2 trials to study the improvement of 2 types of rough grazing in the Republic of Ireland by means of lime and fertilisers. The first trial was carried out

on deep blanket-bog peat in N.W.Mayo, with a sparsely distributed vegetation of Schoenus nigricans and Molinia caerulea. All plots were surface-sown with a Cockle Park herbage mixture at rates of 17 or 30 lb/ac, in combination with 3 tons lime/ac, or no lime, and all combinations of 3 levels of N, 3 of P and 2 of K. In the absence of N, establishment of herbage spp. was poor initially, but grasses increased markedly after the white clover became established. Establishment of sown species was nil where no P was applied. Applications of lime depressed stands of M. caerulea and Erica sp., but increased S. nigricans. Poaching was a problem on these plots when the sown species had become established as a sward. The second trial was carried out on so called half-bog, typical of much of the central plain of Ireland. The flora consisted of Agrostis spp. (40%), Anthoxanthum odoratum (11%), Festuca rubra (3%), Holcus lanatus (3%), white clover (0.7% and weeds (30%). Rates of 0, 30 or 60 # N, 0, 24 or 48 # P, and 0, 50 or 100 # K were applied in all combinations. In subsequent years one-half these rates were used. Plots were not cultivated. The results indicated that the swards reached their maximum level of increased production in the 3rd season and that the demand for the nutrients supplied was relatively low. - P.J.D. [O.W.]

36. ORMROD, J.F. (N.A.A.S., W.Midland Region, Shardlow, Derby, England). The use of chemicals in the renovation of difficult swards in the East Midlands of England. Proc.5th Brit.Weed Control Conf.1960, pp.6.

Application of dalapon 7.5 # + 2,4-D ester 1.5 #, or dalapon 15 # + 2,4-D ester 1.5 # in 20 gal spray were applied on 29th May, 18th July or 17th September to (a) a hill sward at 1350 ft altitude consisting mostly of Nardus stricta, Deschampsia flexuosa and Agrostis spp. on infertile, wet soil with a thick, acid mat, and to (b) a lowland sward at 350 ft altitude on soil of moderate fertility with a sward of Agrostis spp., Lolium perenne, clover and broad-leaved weeds. There were no appreciable differences between dates of application in the degree of initial top-growth kill of grass. Dalapon 15 # gave complete kill of top growth and 7.5 # about 80% kill. On the lowland sward treated in May, recovery was rapid and regrowth was virtually complete after 6 weeks. Recovery was relatively slower after the July and slowest after the September treatments. Initial kill and recovery were both much more rapid on the lowland sward. The addition of 2,4-D ester was ineffective in killing broad-leaved weeds at all dates of application and the spread of these weeds in the lowland sward after the grass had been killed was considerable. In further trials in which 2,4-D, MCPA and MCPB formulations + dalapon, were applied to sward heavily infested with of Ranunculus repens, satisfactory kill of R. repens was achieved in all cases where these herbicides were applied alone, whereas when they were used with dalapon, control was poor and other broad-leaved weeds also appeared. In trials in 1959 in which a hill sward was treated in October with dalapon 8 # + activated amitrole 4 #, kill of top growth was good, but broad-leaved weeds were not controlled. It was considered that where broad-leaved weeds were a problem, they might best be controlled by 2,4-D or MCPA applied in spring or summer before applying dalapon, so that the existing grass sward would eliminate them by competition; autumn seemed the best time to apply dalapon. It seemed unlikely that without cultivation, broadcast seeds could be reliably established over a wide range of dense swards by relying on rainfall and stock trampling alone. The pitch-pole harrow appeared to be suitable for cultivating moderately dense swards, but only rotary cultivation was thought suitable for very dense, matted swards. The use of herbicides and re-seeding was not thought economic in most cases on poorer types of hill sward and that the technique had much greater potentialities on marginal land in lowland areas. - P.J.D. [O.W.]

37. ROWLANDS, A. (N.A.A.S., Trawscoed, Cardiganshire, Wales). Improvement studies on Festuca/Nardus and Calluna/Molinia areas. Proc.5th Brit.Weed Control Conf., 1960, pp.5, tabs.2, bibl.5.

In trials at 4 locations in Wales during 1956-9, hill swards were treated as follows: (a) Nardetum on open hill grazed by sheep received P + lime and oversowing with seed cleanings, (b) Nardetum on open hill grazed by sheep and cattle, otherwise as for (b), (c) Callunetum grazed by cattle, received lime + basic slag and oversowing (no surface cultivation) with a herbage seeds mixture (including Trifolium hybridum), (d) Nardetum on enclosed hill grazed by sheep and receiving (1) dalapon 6 # a.e., herbage seeds sown 24 hours after spraying and fertiliser (lime, NPK) 7 days before or 4 weeks after spraying, (2) dalapon 12 # a.e., fertiliser 4 weeks after spraying and seeds sown 4 or 10 weeks after spraying. Controls received fertiliser but no dalapon and no surface

cultivation was carried out. At locations (a) and (b), the establishment of sown grasses after 12 months was poor, Molinia caerulea and Nardus stricta declined, especially on plots receiving lime + P and Festuca spp. tended to increase at the expense of Agrostis spp. The proportion of white clover was only 8% on (a), but 20-24% on (b) where sheep and cattle grazed, which was considered to show the importance of treading by cattle in the reclamation of hill swards. At location (c), the sown species eventually produced a satisfactory cover in the open Callunetum vegetation on most areas and cattle grazing reduced stands of Calluna vulgaris and unsown grasses markedly. At location (d), Nardus stricta and Juncus squarrosa were markedly reduced by dalapon at 6 or 12 #. Festuca spp. were retarded in growth but subsequently recovered and eventually became dominant, though fairly good establishment of sown species was secured within 12 months. - P.J.B. [O.W.]

38. GARDNER, A.L. (West of Scotland Agric.Coll.,Auchincruive,Ayr,Scotland). The use of dalapon for grassland improvement in the south west of Scotland. Proc. 5th Brit.Weed Control Conf.1960,pp.6, tabs.2,bibl.7.

The use of dalapon for the improvement of hill grazings in Scotland is discussed. In a trial in 1958-59, a permanent pasture of Festuca rubra, Cynosurus cristatus, Anthoxanthum odoratum, Poa spp., Holcus lanatus, perennial ryegrass and white clover was sprayed with MCPA in the autumn of 1958 to remove Juncus spp. and 2 tons lime + 1 ton slag/ac was applied. In April, 1959 dalapon 3.75 # was applied, which temporarily inhibited grass growth. Herbage seed sown in dry conditions in May did not result in establishment. The sprayed area, however, showed a marked development of white clover (20% ground cover 1 year after spraying) compared with those not sprayed, but which received lime + basic slag (16%). Agrostis spp. on the sprayed plots comprised 6% and perennial ryegrass 28%, compared with 40 and 10%, respectively, on unsprayed areas. It was considered that the use of low rates of dalapon showed promise as an adjunct to grassland improvement. - P.J.B. [O.W.]

39. DAVIES, G.E., HUNTER, R.F. and KING, J. (Hill Fmg Res.Org.,48 Palmerston Place,Edinburgh 12,Scotland). Hill pasture improvement with dalapon. Proc.5th Brit. Weed Control Conf.1960, pp.4, tabs.3,bibl.1.

A report is given of 6 trials in 1959 and 1960 on the use of dalapon as a pre-treatment before reseeding hill pastures dominated by Agrostis/Festuca, Nardus stricta and Molinia caerulea. The 1959 season was very hot and dry and no establishment of sown species was obtained. Agrostis tenuis was more susceptible to dalapon applied in May than in August, while the reverse was the case for Festuca ovina. With A. tenuis, dalapon at 5 # in May gave considerable stand reductions, while 10 # in August was necessary with F. ovina. Molinia caerulea and Nardus stricta were both controlled by dalapon at 5 #, though with M. caerulea, control was poor following early treatment in May in one trial. Species resistant to 10 # rates of dalapon were: Holcus lanatus, H. mollis, Anthoxanthum odoratum, Deschampsia flexuosa, Carex spp., Galium hercynicum, Potentilla erecta and Vaccinium myrtillus. Except where resistant species were present, it was thought that serious competition to sown species would follow the use of all rates of dalapon up to 20 #. No consistently satisfactory technique for turf treatment prior to reseeding was found, though heavy pitch-pole harrowing showed some success. For oversowing purposes, it was thought that autumn treatment with dalapon followed by spring sowing was superior to spring treatment. Burning did not result in better establishment. - P.J.B. [O.W.]

40. SPRAGUE, M.A. (New Jersey Agric.Exp. Sta.,New Brunswick,N.J.,U.S.A.) Seedbed preparation and improvement of unplowable pastures using herbicides. Pap.read at 8th Internat.Grassl.Congr.1960, pp.3,bibl.3.

Of herbicides tested in New Jersey, mixtures of amitrole 1 # + dalapon 4 #, applied to closely grazed swards during the growing season, have given consistently good sward kill with no visible injury to grass/legume mixtures sown 3 weeks after treatment. The swards consisted mainly of Poa spp., Danthonia spp., Anthoxanthum odoratum, Agrostis spp. and numerous small, perennial, broad-leaved species. Mixtures of dalapon 4 # + cacodylic acid 2 # also gave promising results. Cacodylic acid applied the same day as herbage species were sown, following dalapon applied 3 weeks previously, had no adverse effect on the sown species. Cacodylic acid at up to 12 # has been applied on the same day as seed of Sorghum sudanense has been sown, without causing seedling injury. There was evidence that the adverse effect

on seedlings of sown species of actively growing, incompletely killed swards was due to factors besides competition for moisture and N. The following schedules are described: 1. Heavy grazing in spring and summer, application of herbicides in early August, re-seeding in the last week of August after tillage and fertilizer treatments. 2. Application of herbicide in late August after the late-summer flush of grass growth has been removed by close grazing. Sow cereals (for grazing) + perennial grasses in mid-September, graze for about 3 weeks beginning in mid-October (in New Jersey). Broadcast legumes on frozen soil in late winter, graze the cereals in spring. 3. Remove spring grass flush by hard grazing, followed by immediate application of herbicides in mid-May. S. sudanense sown in early June will give grazing before a perennial herbage mixture is sown in late August. - P.J.B. [O.W.]

41. MATTHEWS, L.J. (N.Zealand Dep.Agric.) Chemical ploughing in New Zealand. Span, 1960, 3,(4), 160-3, figs.2.
The results of trials in New Zealand on the use of herbicides for sward destruction prior to reseeding are reviewed. Where direct comparisons have been possible, pasture establishment after using herbicides has been slower than where cultivation was used and the swards have, in general, been less pure where herbicides were employed. The long-term results, however, are considered to have favoured the use of herbicides; their use has resulted in a relatively slower release of N in the soil, and a better balance of N to P and hence a better balance of grass to clover in the first years of sward establishment. Dalapon at rates up to 5 # has controlled more inferior grasses, including Holcus lanatus, Poa trivialis, Poa annua, Sporobolus pectinatus and Bromus mollis, without seriously affecting ryegrasses and cocksfoot. From the point of view of residues, it is considered that dalapon ester may be more suitable for use than the Na salt. The addition of amitrole 1 # to dalapon to kill broad-leaved weeds has been effective, but residues have again caused trouble. The importance of the existence of a cover of dead litter for protecting seedlings of sown species from frost or desiccation under unfavourable climatic conditions is stressed. Under warm conditions [not specified], about 14 days between applying dalapon + amitrole is considered sufficient; under relatively cool conditions, it is thought better to apply the herbicides in early winter before reseeding in early spring. In areas of adequate rainfall, reseeding can be done in spring or autumn, but autumn is considered best; for success an annual rainfall of more than 30 in. is considered necessary. The limitations of the use of herbicides for pasture renovation are discussed. - P.J.B. [O.W.]

42. DUNCAN, A.A. (Dep.Agric., Wanganui, New Zealand). Improvement of hill country pastures. N.Z.J.Agric., 1960, 101,(1), 93.
A trial is described in which oversowing with a grass/clover mixture + top dressing with 3 cwt superphosphate + prior spraying with dalapon 5 # was compared. Although the area was open enough for oversowing at 6-8 weeks after spraying this was not done until 13 weeks after spraying, and thus allowing reinfestation by partially killed grasses. The pasture appeared very similar on all plots and white clover establishment was as good on the unsprayed as on the sprayed. The 5 # rate was not enough to give a complete kill of the existing turf on either the closely grazed or the rank areas, but the kill was better on the closely grazed swards. - D.M.L.S. [O.M.]

43. AGABABJAN, Sh.M. (Armenian Anim.Husb. Res.Inst., Erevan, U.S.S.R.) Efficiency of methods of mountain grass improvement as affected by altitude. Pap. read at 8th Internat.Grassl.Cong. 1960, pp.2.
Methods of grassland improvement, including reseeding, fertilizer treatment and weed control used in different climatic zones of the Armenian SSR are reviewed. Early cutting of pastures, together with the application of NP fertilizer is said to lead to a rapid elimination of weeds and increases in herbage yields. The efficiency of this technique increases from the steppe to the sub-alpine zones, but decreases slightly from the sub-alpine to the alpine zones. - P.J.B. [O.W.]

44. ANDREEV, V.N. and SAVELIEVA, Z.P. (Far North Agric.Res.Inst., Novil'sk, U.S.S.R.) Reindeer pastures and meadows of the Far North of the U.S.S.R. and some problems of their improvement and utilization. Pap. read at 8th Internat.Grassl.Congr. 1960, pp.3.
The place of herbicides in measures for improving the quality of vegetation in the flood valleys of northern regions of the U.S.S.R. is discussed. All Salix spp. are reported to be controlled by 2,4-D at 4-5

kg/ha in 100 l spray, with ammonium nitrate as an activator. Alnus fruticosa 5 m. high is destroyed by 2,4-D ethyl ester at 4-5 kg/ha. For reducing the proportion of tall herbs in swards, treatment in spring or after cutting with 2,4-D ethyl ester at 1.5-2 kg/ha + ammonium nitrate at 5 kg/ha are reported to give complete control of Archangelica spp., Artemisia spp., Tanacetum vulgare and Anthriscus spp. and to reduce stands of Heracleum sibiricum and Cirsium heterophyllum. - P.J.B. [O.W.]

45. THOMAS, A.S. (Alfriston, Sussex, England). Grass and fire. Pap. read at 8th Internat. Grassl. Congr. 1960, pp.3, bibl. 12.
Observations are made on the effect of burning on the balance between grasses and woody plants. - P.J.B. [O.W.]

46. HEADY, H.F. (Univ. California, Berkeley, U.S.A.) Range management in the semi-arid tropics of East Africa according to principles developed in temperate climates. Pap. read at 8th Internat. Grassl. Congr. 1960, pp.4, bibl.9.
The use of the major principles of range management as guides for land management in E. Africa are discussed, among which are the use of fire and of chemical and mechanical methods of controlling brush species. It is concluded that, at present, mechanical and chemical means of brush control have their greatest application in the reduction of dense brush stands so that grasses can increase and other less expensive means of brush control be used subsequently. - P.J.B. [O.W.]

47. FORSTER, R.H., WILSON, P.N. and DUTHENWORTH, H.H. (Imp. Coll. Trop. Agric., Trinidad, West Indies). Pasture grass investigations in Trinidad with special reference to pangola grass (Digitaria decumbens). Pap. read at 8th Internat. Grassl. Congr. 1960, pp.3, figs.1, tabs.2, bibl.5.
Mention is made of the necessity for eliminating the major weed, Paspalum fasciculatum, by cleaning the seedbed in the previous season before planting D. decumbens. - P.J.B. [O.W.]

48. OAKES, A.J. (U.S. Dep. Agric., Kingshill., St. Croix, U.S. Virgin Is., West Indies). Pangola grass (Digitaria decumbens Stent.) in the Caribbean. Pap. read at 8th Internat. Grassl. Congr. 1960, pp.4, tabs.4 bibl.6.
Observations are made on the ability of D. decumbens to compete successfully with weed species in tropical pastures. When planted in rows 3 ft apart in established Andropogon pertusus sward, D. decumbens formed a complete plant cover over the whole area within 2 years. - P.J.B. [O.W.]

49. APT, W.J., AUSTENSON, H.H. and COURTNEY, W.D. (Washington Agric. Exp. Sta., Pullman, Wash., U.S.A.) Use of herbicides to break the life cycle of the bentgrass nematode Anguina agrostis (Steinbuck 1799) Filipjev 1936. Plant Dis. Reptr, 1960, 44, (7), 524-6, tabs.3, bibl.3.
Dalapon, amitrole, MH, endothal, monuron and dinoseb were applied at different rates in 100 gal water on 3rd May or (in some cases) 17th June, 1955, to Colonial bentgrass (Agrostis tenuis) mainly infested with A. agrostis. Dalapon 10, 20 and 30 # killed the grass. Endothal and dinoseb had little effect on heading. Two applications of dalapon each at 5 # and MH 8 or 16 # were approximately 90% effective in reducing numbers of heads. Amitrole at 5 and 10 # permitted 25-50% heading, but killed the nematodes in the seed galls. Monuron was erratic in its effect. Amitrole 10 # resulted in significant seed yield increases in the year following treatment; yield increases with the dalapon and MH treatments were large, but not significant. It was concluded that the use of herbicides was cheaper and more effective than summer-fallowing or other mechanical treatments for controlling bentgrass nematode. - P.J.B. [49(79.7)]

HORTICULTURAL, ORNAMENTAL AND PLANTATION CROPS

See also 16, 148.

50. van der ZWEEP, W. (Inst. Biol. Scheik. Onderz. LandbGewassen, Wageningen, Netherlands). Het onkruidbestrijdingsonderzoek in tuinbouwgewassen in Nederland. [Weed control research in horticultural crops in the Netherlands.] Meded. Dir. Tuinb., s'Gravenhage, 1959, 22, (6), 301-5, (Du.e.)
A brief review of the present position in the Netherlands. - P.J.B. [206(492)]

51. * van de LAAR, H.J. Chemische onkruidbestrijding in tuinen en parken. [Chemical weed control in gardens and parks.] De Boomkwekerij, 1960, 15,(23),283-5.

52. WARREN, G.F. (Purdue Univ.,Lafayette, Indiana,U.S.A.) Use of pre-emergence herbicides for vegetables in the United States. Proc.5th Brit.Weed Control Conf.1960, pp.5, bibl.3.
Weed problems in horticulture in the U.S.A. are reviewed briefly and compared with those in Great Britain. Pre-em. herbicides in commercial use are briefly discussed individually and promising new herbicides mentioned. - P.J.B. [O.W.]

53. ALBAN, E.K. (Dep.Hort.,Ohio Agric.Exp. Sta.,Ohio,U.S.A.) Chemical weeding of vegetable crops - 1959. Proc.Ohio Veg. Potato Grs' Ass., 1959, 44,57-66, tabs.2.
Suggested weed control practices for use by Ohio vegetable growers in 1959 are tabulated by herbicide and by crop. - H.A. Roberts. [N.V.R.S.]

54. ORSENIGO, J.R. (Everglades Exp.Sta., Belle Glade,Florida,U.S.A.) Chemical weed control for vegetable crops on organic soils of the Everglades. Mimeo Rep.Fla Everglades Exp.Sta., 1959, 60-3, pp.9, figs.6,tabs.2.
Gives revised recommendations for green beans, cabbage, celery (seedbeds post-em. and post-transplanting), sweet corn, and leaf crops (Chinese cabbage, endive, escarole, lettuce and romaine). - D.M.L.S. [43(75.9)]

55. ROBERTS, H.A. and WILSON, B.J. (Nat. Veg.Res.Sta.,Wellesbourne,Warwick,England). The response of vegetable crops to pre-emergence applications of some substituted triazines. Proc.5th Brit.Weed Control Conf. 1960, pp.4, tabs.2,bibl.1.
Three field trials were conducted in 1959 in which simazine, atrazine, trietazine and propazine at rates of 0.25, 0.5 and 1 # were applied in 100 gal spray immediately after sowing to 12 vegetable crops on sandy loam soil relatively low in organic matter. Radish, cabbage, lettuce, spinach, beet and onion were susceptible to all 4 compounds at rates sufficient to give weed control. Carrots were very susceptible to simazine and atrazine, but much more tolerant to propazine and was the only crop injured more by trietazine than propazine. Propazine 0.5 # caused stunting and chlorosis,but did not affect yield. Parsley showed tolerance to propazine and trietazine; propazine at 0.5 # caused chlorosis, but did not affect yield. Parsnips also showed tolerance to simazine; 0.5 # caused temporary chlorosis and 1 # caused yield reductions in some cases. Propazine at 0.5 # gave good weed control in parsnips without reducing yields; trietazine also showed promise. Peas had little inherent tolerance to simazine, propazine and atrazine, but showed some tolerance to trietazine. With broad bean, simazine 0.5-0.75 # gave good weed control with no crop injury. Depth of sowing appeared to be critical with this crop. Trietazine at 2 # had no observable effect on broad beans and seemed to merit further test. Dwarf French beans were more susceptible to simazine, atrazine and propazine than peas or broad beans; only trietazine appeared worthy of further tests with this crop. It was concluded that atrazine did not show sufficient selectivity to be of use on any crop. Simazine showed promise only on broad bean, propazine was worthy of further tests on carrot, parsley and parsnip and trietazine seemed worth further testing with parsley, parsnip and the 3 legumes. - P.J.B. [O.W.]

56. ROBERTS, H.A. (Nat.Veg.Res.Sta., Wellesbourne,Warwick,England). Weed control with dinoseb (amine) in runner and french beans. J.hort.Sci., 1960, 35,(4),266-74, figs.3,tabs.4,bibl.4.
In 12 trials during 1957-9 on sandy loam, dinoseb triethanolamine salt at 3 or 6 # in 100 gal spray was applied pre-em. either overall, or in a band over the crop row. The seed was sown at normal depths and all plots received inter-row cultivation as necessary, leaving a band of undisturbed soil 4-6 in. wide along the crop rows. Weed kill was assessed just before the first inter-row cultivation. Good control (minimum of 72 and 90% for the 3 and 6 lb rates, respectively) of annual weeds was obtained in all trials. Weed weights, as determined at harvest, were reduced by >53% for the 3 lb rate and by >73% for the 6 lb rate. Senecio vulgare, Chenopodium album, Stellaria media, Spergula arvensis and Fumaria officinalis were readily killed. Rates of 3 # did not always give adequate control of Polygonum aviculare, Trifolium repens and Poa annua. In 4 trials with dwarf French beans, dinoseb was applied either just after sowing, or just before emergence. In 3 out

of 12 trials (all in the very wet year of 1958), the 6 # rate retarded emergence; bean yields were reduced by <30% and yields were in all cases higher than those from plots receiving inter-row cultivation, only. Weed control and crop response were similar for crops receiving dinoseb immediately before emergence, or just after sowing. From the results, it is suggested that band applications of dinoseb at 3-4 # show promise and are worthy of further test. - P.J.B. [O.W.]

57. GAST, A. and GROB, H. (J.R.Geigy A.G., Basel, Switzerland). Triazines as elective herbicides. Pest Technol., 1960, 3,(3), 68-73, figs.2, tabs.6, bibl.2.
The use of simazine and atrazine for weed control in maize, vines and other crops and the use of propazine as a selective herbicide are reviewed. For weed control in carrots, propazine 0.5 # a.i. pre-em. (1 # on soils rich in organic matter) is recommended for 14 named varieties. - P.J.B. [O.W.]

58. GAST, A. (J.R.Geigy A.G., Basel, Switzerland). Neuere triazine. [Newer triazines.] Meded.LandbHogesch., Gent, 1959, 24,(3-4), 857-63, tabs.5, bibl.3.
Data are given of trials in 1958 in which propazine was applied to celery and carrots. Celery was planted on 19th June, rates of 1, 2, 3, 5 and 10 kg a.i. propazine were applied on 8th July and the effects assessed on 2nd October. The principal weeds present were Amaranthus ascendens, Anagallis arvensis, Stellaria media, Sonchus oleraceus, and Poa annua, of which the latter was dominant. Weights of weeds on untreated plots averaged 19.8 kg/plot, while on treated plots virtually no weeds were present. The weight of leaves of celery averaged 95 g/plant, compared with 233 to 306 g for plants on treated plots. Highest leaf weight occurred on plots treated with 3 kg propazine/ha and on these plots, weed weights averaged 0.45 g/plot. Carrots were sown on 5th May and treated pre-em. on 7th May or post-em. on 2nd June with 0.5, 1, 2 and 3 kg a.i. propazine/ha. The principal weeds were Senecio vulgaris Sonchus oleraceus and (dominant) Poa annua. At 43 days after pre-em. treatment the % weeds on plots treated with 0.5, 1, 2 and 3 kg propazine were 34, 21, 8 and 4% of those on untreated control plots, respectively, while reductions in weed populations on plots treated post-em. were 38, 48, 38 and 73%, compared with controls. No data of carrot yields are given. In a further trial in 1958 with silage maize on plots on which the main weed was Agropyron repens, rates of 5 kg each of simazine, atrazine and propazine were applied post-em. on 10th June when the maize was 10-15 cm high. As determined on 30th September the mean yield of controls was 75 kg/ha, compared with 340, 393 and 411 kg for the treated plots, respectively. Data are given showing the relatively much greater penetration of prometone than simazine and atrazine into humus rich soils. - P.J.B. [C.A.]

59. QUAGLIA, A. (Ist.Patologia Vegetale dell' Universita di Bologna, Italy. Prove di diserbo chimico e di tossicita in colture di carota e di sedano. [Weed control and toxicity trials in celery and carrots.] Ann.Sper.Agrar.(n.s.), 1960, 14, CXXXV-CXLVI, (Ital.e.), figs.5, tabs.4, bibl.9.
The following table shows the mortality %s caused to celery and carrots when sprayed (a) 1 month after transplanting and (b) at a late growth stage, by monuron, neburon, chlorpropham, and 2,4-DES:-

Herbicide	MORTALITY % Carrots		Celery	
kg/ha	(a)	(b)	(a)	(b)
Monuron				
0.2	0	0	3.33	0
0.4	40	10	33	10
0.8	53	66	60	66
1.6	90	93	96	100
Neburon				
0.925	0	0	0	0
1.85	3	0	6	0
3.7	16	0	23	3
7.4	36	23	60	30
Chlorpropham				
0.6	0	0	0	0
1.25	0	0	3	0
2.5	26	6	40	10
5.0	63	30	60	63
2,4-DES				
0.95	3	0	6	0
1.9	26	16	20	6
3.8	40	26	50	23
7.6	90	60	93	76

The susceptibility of 24 common weeds, including Chelidonium majus, Centaurea cyanus, Euphorbia helioscopia, Myosotis palustris, and Potentilla reptans, to these 4 weedkillers is tabulated. - D.M.L.S. [C.A.]

60. NETHERLANDS, PROEFSTATION VOOR DE GROENTETEELT IN DE VOLLE GROND. Onkruidbestrijding. [Weed control.] 5e Jaarversl. Proefst.GTeelt Volle Grond, Alkmaar 1959, 1960, 97-103.

Brief notes are given of trials in 1959, an exceptionally dry year.

Endive. Of herbicides applied 1 day before planting winter endive, only neburon and to a lesser extent chlorpropham gave yields comparable to those of controls.

Asparagus. PCP applied as soon as weeds appeared after harvest gave excellent control. Monuron and simazine applied after ploughing (after harvest) gave good weed control initially, but their effect soon declined.

Green peas. Of post-em. treatments applied when a few weeds were visible, only dinoseb gave complete weed control in the very dry conditions.

Celeriac. Of a number of urea and triazine herbicides applied to very dry soil shortly after planting, only neburon gave satisfactory weed control.

Red beet. In no case did yields where chlorpropham pre-sowing or pre-em., simazine or propazine 1 kg/ha, or 2 other unspecified herbicides pre-em. equal those where weeds were hoed.

Parsley and celery. Combinations of PCP in oil + chlorpropham pre-em. gave very good weed control.

Rhubarb. On plots laid down in 1957, 2 kg simazine/ha applied for 3 consecutive years caused no crop damage and given virtually complete weed control at times when the crop did not give full ground cover.

Beans. In the dry conditions of this year, a combination of chlorpropham + diquat [rate not given] gave excellent weed control.

Spinach. The use of low rates of simazine or chlorpropham for weed control in winter spinach, in combination with contact herbicides, markedly reduced yields. Diquat pre-em. gave excellent results.

Chicory. Of a number of herbicides tested, chlorpropham and diuron gave the best results. Crop growth was excellent with chlorpropham, but less satisfactory with diuron. - P.J.B. [Md.H.]

61. SYTSMA, R. Chemische onkruidbestrijding bij de zaadteelt van sluitkool. [Chemical weed control in cabbage grown for seed.] Tijdschr.PlZiekt., 1960, 66, 130.

In trials with cabbage grown for seed (normally sown in early August), applications of propham, chlorpropham and TCA made at the time growth was beginning after winter, resulted in most cases in plant injury and in many cases yield decreases also. Simazine applied either in autumn or in spring, with or without earthing-up in spring, maintained almost weed-free conditions up to the time of harvest, with little evidence of crop injury. - P.J.B. [C.A.]

62. NETHERLANDS, PROEFSTATION VOOR DE GROENTEN-EN FRUITTEELT ONDER GLAS DE NAALDWIJK. Herbiciden (onkruiddodende middelen). [Herbicides (weedkilling chemicals). Jaarversl.Proefst.Groent.-en Fruitteelt Onder Glas,Naaldwijk, 1958, [n.d.], 138-9.

In a trial with scorzonera, chlorpropham at 4 l/ha, or as granules at 16 kg/ha and CDEC at 5 and 10 l/ha [rates of a.i. not given] were applied when the crop was 4 cm high. Weed control was best with the 4 l rate of chlorpropham, followed by the granular application. No crop damage was noted. In a trial with cucumbers under frames, simazine at 1 kg/ha gave moderate weed control, but caused some crop injury. NPA at 10 kg/ha was ineffective against weeds, while chlorpropham at 4 l/ha severely damaged the crop. Covering the soil with black plastic gave good weed control, but reduced cucumber growth, which was attributed to the great temperature variation under the plastic. - P.J.B. [Md.H.]

63. DENMARK, STATENS FORSØGSVIRKSOMHED i PLANTEKULTUR. Allylalkohol til bekaempelse af ukrudt. [Allyl alcohol for the control of weeds.] Tidsskr.Planteavl., 1959, 63, 532-5.

In trials during 1957-8 at 3 locations in Denmark, allyl alcohol was applied at a rate of 10 ml in 5 l water per m^2 at 1, 2, 4, or 8 days before spinach seed was sown. Weed numbers [at harvest?] were reduced by approximately 95% by each treatment and weight of crop was increased by 43, 27 and 40% by applications made 2, 4 and 8 days before sowing, respectively. Treatments at 1 day before sowing increased yields by 3%. With peas, rates of 10 ml allyl alcohol applied at sowing or 3 days after resulted in severe damage in most cases. Applications made at 6 days before sowing were tolerated by peas and amounts of weeds were reduced by about 75%. The results of further trials with spinach indicated that optimum rates of allyl alcohol were 5-10 ml per m^2. In trials in which allyl alcohol was applied to forcing beds after the soil had been prepared for transplanted celery, rates of 5, 10 or 20 ml in 10 l water per m^2, made 4 days before

transplanting gave good weed control and did not injure the crop. Where 10 ml allyl alcohol was applied in 2.5, 5 or 10 l water 2 days before sowing spinach, best results were obtained with 5 l water; 2.5 l gave least satisfactory weed control. Where rates of 5, 10 and 20 ml allyl alcohol were applied immediately after onion setts had been planted and covered with soil, injury to the onions resulted in all cases. At the rates used in these trials, there was no evidence of accumulation of allyl alcohol in the soil. From these results it was concluded that optimum rates of allyl alcohol were 5-10 ml/m^2, it should be applied not less than 4 days before a crop is sown and in sufficient spray volume to place it 2-5 cm deep in the soil, for which purpose 5 l spray volume is considered sufficient in soil which was not too dry. Allyl alcohol is classed in Denmark as a Group A poison and its use in confined spaces is prohibited. - P.J.B. [O.RE.]

64. MITSKOVSKI, J. [Use of total and selective herbicides for controlling weeds in tobacco beds and their effects on the tobacco plants.] Duvan, 1959, 9,288-307.

Among the total herbicides Weecide (sodium arsenite) applied at 2 and 3 cc/m^2 20 and 30 days before sowing gave the best results, decreasing weeds by 42-47% and tobacco seedlings by only 5-15% compared with control plots. Other total herbicides were also effective in weed control but at the same time decreased the number of tobacco seedlings. Among the selective herbicides Fitoksol 15 (PCP) gave effective control and had a positive influence on the number of seedlings; when applied at 6 and 8 cc/m^2 20 days before sowing, 17-30% more seedlings and 64-67% fewer weeds were obtained. Calcium cyanamide was also effective in controlling weeds without seedling injury, when applied under wet conditions at 50 and 100 g/m^2 20 days before sowing. These rates increased seedlings by 5-10% and decreased weeds by 67-82%. Deformation of leaves and stalks was caused by direct treatment of tobacco plants with 2,4-D and 2,4,5-T at 0.1-2.0%. - Hort.Abstr., 30,(4), 5299.

65. STRYCKERS, J. (Rijkslandbouwhogeschool,Gent,Belgium). Enkele nieuwe teelttechnieken voor geneeskruiden. [Some new cultural techniques for medicinal plants.] Land en TuinbJaarb.1960-61, 1960, 201-6, figs.4,bibl.3.

Excellent control of mono- and dicotyledonous annual weeds was secured in angelica (Angelica archangelica) following applications of propazine at the 2- to 2.5-leaf stage (8-12 cm high) at a rate of 0.75 kg/ha a.i. 3 weeks after planting. Chlorpropham was tolerated by angelica at rates up to 3 kg/ha a.i. applied under the same conditions as propazine to a recently hoed soil surface before weed emergence. With valerian (Valeriana officinalis), propazine was even more toxic than simazine; with this species, chlorpropham and cyclo-octyl dimethyl urea (OMU) + butinol chlorphenyl carbamate (BiPC) were safest. With chlorpropham on light and humus-poor soils, rates not greater than 2 kg/ha were considered advisable and for OMU + BiPC, 1.1 kg; control of Senecio vulgaris was poor with both herbicides. - P.J.B. [104(493)]

66. GAST, A. The use of triazine herbicides in horticulture, especially on flowers and ornamentals. Proc.5th Brit.Weed Control Conf. 1960, pp. 5.

In trials begun in 1958, propazine was safer than simazine for use in conifers, but less safe than simazine in broad-leaved trees; trietazine was very safe in both types, but was inferior in controlling weeds. In a trial begun in 1957, only one rose variety, Ime Pierre S. du Pont was injured by simazine, whereas New York, Friedrich Schwarz and Comtesse Vandal showed no damage. In a trial in which 8 varieties of rose were grafted on to Rosa laxa rootstock in 1956, the plants were covered with soil during the winter. In the following spring, the soil layer was removed and simazine 1, 3 and 5 lb applied with no precautions against contact of the herbicide with the plants. No phytotoxicity was noted, even in Ime du Pont and weed control was excellent at all rates. Injection of simazine into the root region of the variety Spek's Yellow at a rate equivalent to a surface application of 3 lb caused no phytotoxicity, indicating that roses appear to possess natural resistance to this compound. In an experiment with 3 varieties of rose rootstocks, Rosa multiflora showed considerable sensitivity to simazine applied at 2.5, 5 and 7.5 lb one month after planting on 15th April, 1958. Rosa laxa showed some phytotoxicity where 7.5 lb was applied, but the symptoms disappeared during the growing season; Rosa canina Brüghs showed no toxicity at any rate of simazine. Gladiolus was treated with simazine at rates up to 5 lb in a number of trials. The 5 lb rate caused some damage in rainy summers, but never enough to kill the plants. In trials with different varieties, Aranjuez and Mansoer showed toxicity at rates as low as 1 lb; Neu

Europa, Atlantic and Poppy Day were injured by rates of 3 lb., while Joe Wagenar showed almost no injury at rates of 5 lb. Alfred Nobel, Sans Souci, Harry Grant, Johann Strauss, Picardy, Paul Rubens, Neu Europa and General Eisenhower showed damage at 5 lb but not at 3 lb. Treatments of established delphinium plants with simazine 1 2, 3 and 5 lb in spring 1958 and 1959 resulted in no toxicity.

In trials in 1958, the following perennial species were treated with simazine 2 lb: Solidago, Iberis, Papaver, Kniphofia Delphinium, Helenium, Sedum and Paeonia and the following with 1 lb: Hemerocallis, Sedum and Iris. No abnormalities were noted in any species during the growing season. In trials with soil to be used for chrysanthemum culture, applications of simazine 1 and 2 lb in mid-May 1958 had no toxic effect on chrysanthemums planted out in July and maintained excellent weed control. Of different flowers sown on soil treated during the previous season with simazine and propazine, Viola tricolor and Cheiranthus showed little toxicity, while Myosotis suffered considerable damage. It was considered that the relatively short residual effect of methyl-mercapto triazines may indicate that they have more potential value for horticultural crops than simazine and propazine. - P.J.B. [O.W.]

67. JEFF, A.E. (Rosewarne Exp.Hort.Sta., Camborne, Cornwall, England). Observation studies on the use of residual herbicides on anemonies during 1958-59 and 1959-60. Proc.5th Brit.Weed Control Conf.1960, pp.6, tabs.4.

In trials in 1958, the following were applied pre-em. on 15th July to anemonies planted on 9th July: chlorpropham 1, 2 and 4 lb, fenuron 0.5, 1 and 2 lb, simazine 0.5, 1 and 2 lb, monuron 0.5, 1 and 2 lb, chlorpropham 2 lb + fenuron 0.5 lb. Conditions were very wet for some weeks after treatment. Weed control was very effective with simazine and, to a slightly less extent, with monuron. Fenuron was ineffective and chlorpropham 4 lb caused crop damage, as did chlorpropham + fenuron. Simazine at 0.5 lb and monuron 1 lb resulted in the highest yield of marketable flowers; higher rates of simazine caused yield reductions. In the very dry season of 1959, the following were applied 10days after planting corms: chlorpropham 0.5 lb + fenuron 1 lb, monuron 0.5 and 1 lb, simazine 0.5 and 1 lb and PCP 4.5 lb. Results with residual herbicides were poor. The best residual weed control was given by chlorpropham + fenuron and by monuron 1 lb. No material phytotoxicity was noted in any case. - P.J.B. [O.W.]

68. JERSEY STATES EXPERIMENTAL STATION. Anemones. Weed-killer trial. Rep.States exp.Sta.Jersey for 1959, 1960, 39.

Undiluted tractor vaporising oil or 10% sulphuric acid, both applied 4-6 days before emergence at a rate of 20 gal/vergee (= 4/9 ac), gave excellent initial weed control in anemones. A proprietary pentachlorophenol preparation applied at the normal rate at this time also gave good weed control but checked crop growth. Residual treatments at the normal rates (chlorpropham, fenuron, chlorpropham + fenuron, 2,4-DES) were not successful, causing severe crop injury. A proprietary spray containing 40% phenols did not affect the crop, but gave poor weed control at the normal rate [not stated]. - H.A. Roberts. [N.V.R.S.]

69. WOOD, J., HOWICK, S.J. and TURQUAND, E.D. (Kirton Exp.Husbandry Fm, Lincs., England). Trials of herbicides on narcissus and tulip beds. Proc.5th Brit. Weed Control Conf.1960, pp.6, tabs.2, bibl.2.

In field trials during 2 years with narcissus and tulips, chlorpropham was used pre-em. in early winter alone, in mixtures with fenuron or diuron, or following the application of PCP. Post-em. treatments in late winter were also applied at different growth stages. No treatment was consistently satisfactory in both years. Chlorpropham, in general, gave good results and the addition of fenuron and diuron increased its effectiveness. The use of PCP as a pre-em. contact herbicide to ensure that the seedbed was clean before applying chlorpropham was desirable. Chlorpropham at 2 lb applied to tulips before the leaves separated when about 2 in. high, caused no crop damage. On observation plots, diquat showed promise as a pre-em. contact herbicide, while for post-em. use, neither simazine nor diuron gave adequate control of weeds when used at rates low enough to be non-toxic to the crop. - P.J.B. [O.W.]

70. NETHERLANDS, PROEFSTATION VOOR BLOEMBOLLENCULTUUR, LISSE. Wat doen we met het kruiskruid. [What we do with groundsel.] Weekbl.BloembollCult., 1960, 70,634.

The only safe herbicide for bulb crops is chlorpropham, but in controlling chick-

weed it encourages the spread of the resistant Senecio vulgaris for which, at present (it is stated), there is no other means of control than mechanical or hand weeding. - Hort.Abstr., 30, (4), 5266.

71. AHRENS, J.F. and OLSON, A.R. (Connecticut Agric.Exp.Sta., New Haven, U.S.A.) New materials control crabgrass. Frontiers of Plant Sci., 1960, 13, (1), 2-3, figs.2.

In trials in Connecticut on uniform stands of Digitaria spp., in turf, Dacthal, (dimethyl 2,3,5,6-tetrachloroterephthalate), Zytron (O-(2,4-dichlorophenyl)-O-methyl-isopropylphosphoroamidothioate and calcium arsenate were all applied in late April or early May as dry powder formulations. Dacthal 10 % a.i., Zytron 20 % a.i. and calcium arsenate 370 % gave 97, 99 and 95% control of Digitaria spp. in September, with 0.3, 0.06 and 3 plants/ft^2 remaining, respectively. No injury to Poa pratensis, Festuca rubra and Agrostis sp. - P.J.B. [O.W.]

72. van STAALDUINE, D. (I.B.S.Weed Control Dep., Wageningen, Netherlands). The use of simazine in strawberries. Proc.5th Brit.Weed Control Conf.1960, pp.5, figs.1, tabs.6, bibl.8.

The results are presented of 4 year's trials on the use of simazine for weed control in strawberry beds infested mainly with Poa annua, Senecio vulgaris and Stellaria media. Post-harvest applications of 0.5-0.75 kg simazine a.i. as a wettable powder in 1000 l spray/ha made in July-August on different sandy clay soils caused no yield depression during the following year with vars: Jucunda (12 trials), Madame Montot (4 trials) and Oberschlesien (2 trials on sandy soil low in organic matter). In 11 out of 19 trials in which Jucunda received early-spring applications of 0.25-0.5 kg/ha simazine, damage and reduced yields were caused, especially on clay soils poor in organic matter. Symptoms of damage in these trials did not occur until 4-6 weeks after treatment. In trials with autumn planted crops, rates up to 1.5 kg simazine/ha did not significantly reduce yields of Senga Sengana and Talisman on organic, sandy soil. In the rather wet conditions of 1959, Senga Sengana showed no effect from spring applications of 0.75 kg, but Deutsch Evern was damaged by 0.25 kg/ha. In trials with runner-bed crops, pre-planting and early post-planting treatment of Jucunda in April with 0.5-1 kg simazine caused considerable injury; however, treatment of Jucunda on sandy soil with rates up to 1 kg in June caused no injury either to mother plants or to runners. Rates of 0.5 kg simazine applied to Talisman Senga Sengana, Macheraus Frühernte and Deutsch Evern at the time of runner formation in June-July did not affect production of young plants. Simazine applied on 30th July, 195? to sandy soil low in organic matter at rates as low as 0.25 kg gave good weed control for 3 months. Observations are made on the persistence of simazine in these trials. There was evidence that simazine applied in October-November would keep beds substantially clear of weeds until picking time in the following season. - P.J.B. [O.W.]

73. ROBINSON, D.W. (Hort.Res.Cent., Loughgall, N.Ireland). Experiments with dalapon in soft fruit crops. Proc.5th Brit.Weed Control Conf. 1960, pp.7, tabs.4, bibl.23.

In trials with raspberries, plots of var. Lloyd George were planted in February, 1957 and sprayed (directed) with dalapon 3.7 % at monthly intervals from October, 1958 to April, 1959. No obvious phytotoxicity followed spraying during December-February, but treatments outside this period caused injury. Applications in October or early November stunted fruiting laterals, reduced the number of flowers/primary lateral and fruit was small and of poor quality. Treatment in spring caused no obvious injury to fruiting canes, but checked the growth and emergence of young spawn. A second experiment in 1959/60 confirmed these results. In a further trial in which dalapon 3.7 % was applied on 1st December, 1959, 4th February 1960 or 7th April, 1960, only the April treatment resulted in yields significantly lower than the controls. The use of dalapon in December of 3 successive years did not appear to have any adverse effect on yield. Overall applications of dalapon 7.4 % in January, 1959 and February, 1960 caused severe crop damage. With blackcurrants, repeated annual directed applications of dalapon 7.4 % during the growing season caused no apparent injury. A single application of 14.8 % in September slightly reduced growth in the following year. With established gooseberry plants, dalapon at 7.4 % applied between September and March had no adverse effects. Dalapon at 3.7 % in January gave good control of Poa annua and young established plants of Poa trivialis, Holcus lanatus and Agrostis stolonifera. It was concluded that dalapon at 3.7 % was a useful treatment for controlling

several perennial grasses in soft fruit crops, when applied as a directed spray during mid-November to mid-January. - P.J.B. [O.W.]

74. ROBINSON, D.W. (Hort.Res.Cent., Loughgall, Co.Armagh, N.Ireland). Experiments with simazine and other herbicides in soft fruit crops. Proc.5th Brit.Weed Control Conf.1960, pp.7, tabs.5, bibl.6.

Simazine 1, 2 and 4 # and 2,4-DES 6 # were applied to raspberries grown on the same plot in June 1958, May 1959 and again in April 1960. All plots were hoed immediately before treatment. No significant differences in cane vigour or yields were noted between treatments. In a trial in 1960, raspberries in their third crop year were treated on 5th February with simazine and atrazine 4 # and amitrole 2, 4 and 8 #. Simazine had no apparent phytotoxic effects on fruiting canes or suckers; atrazine caused slight marginal necrosis on some of the sucker leaves, though subsequent growth was normal. Amitrole at 2 # caused no injury to suckers, but stunted the foliage of fruiting canes; higher rates caused more serious damage and significantly reduced yields. In further trials with simazine, rates equivalent to 1, 2 and 4 # of crop were applied to bands 1.5, 3 and 6 ft wide, respectively, over the crop rows; rates of 16 and 8 # were also applied to bands 1.5 and 3 ft wide, both treatments being equivalent to a rate of 4 # of crop. Treatments were applied on 25th April 1959 and again on 26th April 1960. No treatment adversely affected crop yield or vigour. In trials in which simazine at 8 # was placed at different depths before planting raspberry canes, severe damage followed placement at depths of 3 and 6 in. but not when placed on the surface. Simazine and atrazine 2 # on recently used soil controlled Poa annua, Holcus lanatus, Agrostis stolonifera, Stellaria media, Senecio vulgaris, Atriplex patula, Polygonum aviculare and P. persicaria for 2 months after application. Simazine 1 # did not always control Polygonum sp. and Atriplex patula. In preliminary trials with blackcurrants and gooseberries, simazine and atrazine gave excellent results. It was concluded that simazine at 2 # was safe to use on established raspberries and would give excellent control of germinating weeds. - P.J.B. [O.W.]

75. SUTHERLAND, J.P. (Scottish Hort. Res.Inst., Mylnefield, Invergowrie, Dundee Scotland). Further preliminary trials of chemical weedkillers in raspberries and strawberries. Proc.5th Brit.Weed Control Conf.1960, pp.5, bibl.1.

In trials in 1959 with 8 herbicides applied on 11th April in 40 gal spray to raspberries planted in late March, atrazine at 2 and 4 # and simazine at 6 # both gave excellent weed control in late spring and the plots treated with simazine remained free from weeds during the whole summer; no crop injury was noted. In trials in 1959 to control Agropyron repens in raspberries, dalapon, amitrole, atrazine, TCA and dalapon + amitrole were applied on 23rd March. Dalapon (8.5 #) gave the best results. Slight chlorosis was noted in the raspberries in early June in young growth and some regrowth of A. repens began in mid-June. Soil surface sprays of simazine 2 #, atrazine 4 #, monuron 3 #, diuron 4 # and fenuron 0.5 # all killed strawberries planted by trowel 2 days later. - P.J.B. [O.W.]

76. WOOD, C.A., SUTHERLAND, J.P. and STEPHENS, R.J. (Scott.Hort.Res.Inst., Mylnefield, Invergowrie, Dundee, Scotland). Effects of the use of herbicides on the growth, cropping and weed flora of raspberry plantations: a progress report. Proc.5th Brit.Weed Control Conf.1960, pp.7, tabs.5, bibl.1.

Two experiments on medium loam are reported. In the first, the following herbicides were applied: (a) TCA 18.6 # a.i. + dinoseb amine 2.8 # a.e., (b) propham 5 # + 2,4-DES 3.6 #, (c) propham 5 # + fenuron 0.5 #, (d) 2,4-DES 3.6 # + fenuron 0.5 #. The treatments were applied in spring after cultivation in 1958, 1959 and 1960. Controls were given normal cultivation. The TCA + dinoseb treatments resulted in total yields during 3 years significantly below those of the other treatments. Differences between the other treatments in total yield were not significant. TCA + dinoseb also resulted in the lowest cane numbers. In the second experiment, the following treatments were applied on 10th April 1959, 9 days after planting, and again on 1st April 1960: (a) simazine 2.5 #, (b) monuron 3.5 #, (c) propham 4 # + 2,4-DES 4.6 #, (d) 2,4-DES 4.6 # + fenuron 0.5 #, all in 30 gal spray/ac. Control plots were hoed. Control plots

gave low yields owing to their having become weed-infested in the spring of 1959, while the plots treated with herbicides remained weed-free. Plots treated with simazine gave the highest yields, followed closely by those treated with propham + 2,4-DES; those treated with monuron showed some phytotoxicity. All 4 treatments markedly reduced weed growth, but simazine and monuron were outstanding and their effect persisted even after cultivations. - P.J.B. [O.W.]

77. SUTHERLAND, J.P. and STEPHENS, R.J. (Scot.Hort.Res.Inst., Mylnefield, Invergowrie, Dundee, Scotland). Effects of some chemical weedkillers on a raspberry cane nursery: a progress report. Proc.5th Brit.Weed Control Conf.1960, pp.5.

Applications of simazine 1, 2 and 3 # a.i., monuron 1, 2 and 3 # a.i. and 2,4-DES 3.6 # + propham 5 # a.i. were made in spring 1958, 1959, and 1960 in 40 gal spray. The crop was planted in May 1958. Cane growth and quality at cane harvest in the winter of 1959/60 was best on plots receiving simazine 2 or 3 # and that on plots receiving simazine 1 # and monuron 3 # was good. Applications of simazine 2 or 3 # eliminated the need for hand cultivation. Very little cultivation was needed after treatment with monuron 3 #; the other treatments were relatively less effective. At 5 months after spring applications, there were no seriously phytotoxic levels of residue in the top in. of soil; rainfall during this period was 8.31 in. Weed species persistent on simazine-treated plots in 1959 included Vicia hirsuta, Polygonum convolvulus and P. aviculare and in 1960, Vicia hirsuta. - P.J.B. [O.W.]

78. HOLLOWAY, R.I.C. (E.Malling Hort. Res.Sta., Kent, England). A progress report of trials of simazine and monuron on some fruit plants. Proc.5th Brit.Weed Control Conf.1960, pp.5.

In trials on well-drained, sandy loam, monuron 5 and 10 # and simazine 2.5 and 5 # were applied to established blackcurrants and raspberry bushes and to apple and pear trees. Following treatment in November 1958, monuron severely damaged blackcurrants; on raspberries injury was less and yields were reduced considerably by the 10 # rate. With 5 # there was no reduction in yield in 1960, but some leaf injury was evident and cane numbers were reduced. With neither crop did simazine cause any apparent injury. In trials with apples and pears during 1 season only, leaf injury was observed only in one case in which a 2-year-old Conference pear showed leaf injury after applications of monuron 10 #. Senecio vulgaris showed considerable resistance to monuron, even at 10 #. - P.J.B. [O.W.]

79. GREAT BRITAIN, LUDDINGTON EXPERIMENTAL HORTICULTURE STATION. Rep.Luddington Hort. Sta.1959, 1960, pp.82.

Control of Agropyron repens in apples, p.17. In trials in 1960, cordon apples were treated with dalapon 5 # in 100 gal water on 2nd April, applied to a strip 2 ft wide. The season was dry and control of A. repens was good up to late July, when rain caused some regeneration. In a second trial, the following were applied: (a) dalapon sodium 5 # on 30th April, (b) dalapon 5 # on 30th April and 23rd May, (c) dalapon 10 # on 30th April. The rates used were approximately equivalent to 4 and 8 # a.e. All the treatments suppressed A. repens, though the 2 5 # treatments were more effective than the single 10 # treatment. Regeneration of A. repens occurred in late summer in all cases.

Strawberries, p.25-31. In trials begun in 1958 fenuron at 0.25, 0.5 or 1 # was applied to strawberries var. Royal Sovereign either in early May after cultivation or early September after cleaning up after picking. Reductions in plant size and yield (not significant) were greatest for the 1 # treatment in spring, followed by 0.5 # in spring and 1 # in autumn. The 0.5 and 1 # rates gave effective weed suppression. Veronica persica showed some resistance. The effect of the autumn treatments did not persist into spring. In a second trial series, the effect of combined winter + summer applications of herbicides on strawberries grown under conditions of minimum soil disturbance were studied. Treatments used were: in winter, chlorpropham 2 #, chlorpropham 2 # + fenuron 0.5 #, dinoseb amine 2 # and hand weeding, each of which was combined with spring and summer treatments of 2,4-DES 5 #, 2,4-DES 5 # + fenuron 0.5 #, or hand weeding. The winter treatments were applied in October and the spring and summer treatments 3 times during the growing season (April, June and August). All the winter treatments reduced plant size compared with hand weeding. Spring and summer treatment with 2,4-DES had no effect on the plants, while 2,4-DES + fenuron reduced the spread, but not the height, of the plants. As assessed in March, the chlorpropham and chlorpropham + fenuron treatments completely controlled Veronica hederifolia, Senecio vulgaris, Stellaria media and Poa annua. By July, the effect of the winter treatments had worn off.

Of the summer treatments, 2,4-DES gave reasonable control of annual weeds, though Chenopodium album, Trifolium repens, Polygonum aviculare and Senecio vulgaris were not fully controlled. Dry conditions in this year may have prevented the breakdown of 2,4-DES in the soil. The addition of fenuron to 2,4-DES resulted in the almost complete suppression of all annuals. Other trials are in progress on the use of simazine, 2 commercial formulations of chlorpropham + fenuron, and diuron for weed control in strawberries. - P.J.B. [O.W.]

80. IVENS, G.W. (A.R.C.Weed Res.Org., Begbroke Hill, Oxford, England). Keeping tree trunks free of weeds. Grower, 1961, 55, (1), 28-9.
The use of PCP, oil, DNOC and tar-oil winter washes, 2,4-D, MCPA, dalapon, amitrole, monuron and simazine for weed control in orchards and of 2,4-DES and chlorpropham for weed control in stool beds is reviewed. - P.J.B. [O.W.]

81. SETTON, B.G., LEWIS, W.A. and POTTER, G.F. Chemical control of briars, volunteer tung seedlings and other broad-leaved weeds in tung orchards. Corresp. Acid HORB-5, 1956, pp.3.
Recommendations are given for the use of 2,4,5-T low-volatility esters. - P.J.B. [60(75.3)]

82. * ARMSTRONG, W.W. Trial of several herbicides for control of nutgrass [Cyperus esculentus] in Coachella Valley, California. Rep.Date Grws' Inst., 1957, 34, 10-11, bibl.11.

83. KRAMER, M. Ervicidas no bananal. [Herbicides for bananas.] O Biologico, 1960, 26, (2), 43-4.
Two applications of 2.5-3 kg/ha diuron in 1000 l water, made to well tilled and cleaned soil in a rainy season or when the soil is humid, are considered to be sufficient to give adequate weed control for 12 months. On non-sandy soils, diuron can be replaced by monuron.- P.J.B. From Fruits, 15, (9), 12367.

84. BUDOWSKI, G. Forestry practices of interest to coffee growers. Coffee, Turrialba, 1959, 1, 50-2, bibl.5.
For the destruction of surplus Erythrina poeppigiana shade trees, 50-150 ml of a mixture of 15% 2,4-D and 2,4,5-T in diesel oil, applied either in frill girdles or in bored holes, proved effective. - Hort.Abstr., 30,5305.

85. STAMPER, E.R. and CHILTON, S.J.P. (Louisiana Agric.Exp.Sta., Baton Rouge, U.S.A.) The effect of Silvex (2,4,5-TP) used as a chemical herbicide on sugarcane in Louisiana. Proc. 10th Congr. Internat. Soc.Sug.Cane Technol.1959, 537-8.
The use of band applications of Silvex at 1 % as pre- and post-em. sprays for sugar cane in Louisiana resulted in small, but consistent, yield increases compared with dalapon, or 2,4-D + TCA, though control of Sorghum halepense seedlings was considerably lower for Silvex than the other herbicides. Both Silvex and dalapon resulted in yield increases of about 400 lb 96° sugar/ac. Silvex at 1 % gave excellent control of wild lettuce (Lactuca sp.). - P.J.B.

86. CHAPMAN, L.S. Weedicide damage in ratoon Trojan. Cane Grws' quart.Bull., 1960, 23, 132-3.
Caused by dalapon 5 % + TCA 7 % applied 2.5 weeks after dalapon 10 %. - Hort.Abstr., 30,5311.

87. HANSON, N.S. (Hawaiian Sugar Planters Ass.Exp.Sta., Honolulu, Hawaii). Chemical weed control in Hawaii. Proc.10th Congr. Internat.Soc.Sug.Cane Technol., 1959, 538-49, figs.8, tabs.3, bibl.8.
The major weed species found in sugar cane fields in Hawaii are listed. These include 2 strains of Cynodon dactylon resistant to dalapon & a strain of Commelina diffusa resistant to 2,4-D, but not to 2,4,5-T. Also reported is a definite increase in the present tolerance of Erechtites hieracifolia to 2,4-D as compared with that of populations treated during 1945-50. Procedures in use in Hawaii for testing herbicides for use on sugar cane are reviewed. Of pre-em. herbicides tested, monuron, diuron and simazine have given weed control for up to 2 months or more, with no adverse effects on germination of sugar cane. 2,4-D, 2,4,5-T, TCA and dalapon have had considerable adverse effects on germination when applied to uncovered seed pieces. Pre-em. applications of 2,4-D and 2,4,5-T on relatively porous soils have reduced stands and crop damage has been caused by monuron

and diuron on soils low in organic matter, sandy soils and on shallow soils underlain by gravels. Simazine has caused less damage than monuron and diuron under these conditions. - P.J.B.

88. ALDHOUS, J.R. (For.Comm.Res.Sta., Alice Holt Lodge, Farnham, Surrey, England). A preliminary experiment on conifer seedbeds with 2,6-dichlorobenzonitrile. Proc. 5th Brit.Weed Control Conf. 1960, pp.4, tabs.2.

2,6-DBN (2,6-dichlorobenzonitrile) was applied as a 50% wettable powder to prepared seedbeds at rates of 0.25, 0.5, 1 and 2 # a.i. in 60 gal spray. Immediately after spraying, half of each plot was lightly cultivated so as to incorporate the 2,6-DBN into the top 2-3 in. of soil. The treatments were applied 2, 4 or 8 weeks before sowing conifer seeds in the first week in April and 2, 4 and 8 weeks before sowing in the first week in May. 2,6-DBN at 2 # + cultivation drastically reduced the stands of all conifer species (Pinus sylvestris, Picea sitchensis, Tsuga heterophylla and Larix leptolepis), irrespective of date of application. Rates of 2,6-DBN 0.25 or 0.5 # had no effect on any species, except Pinus sylvestris, stands of which were reduced by 0.5 # + cultivation applied 2 weeks before sowing in May. Rates of 1 # + cultivation applied 4 or 8 weeks before sowing had no effect on seedlings of Picea sitchensis and Larix leptolepis. Rates of 1 or 2 # + cultivation gave complete weed control until mid-July; rates of 0.5 or 0.25 # gave inconsistent results. 2,6-DBN applied to the soil surface only, had little effect on crops or weeds. - P.J.B. [O.W.]

89. ACKERMANN, F. and HOPPE, R. (Wermsdorf, E.Germany). Erfahrungen über die Anwendung chemischer Unkrautbekämpfungsmittel in der Forstpflanzenanzuch. [Experiences in the application of chemical weed control methods in forestry.] Forst und Jagd, 1960, 10,(5),229-31, tabs.1.

Researches with EP 30 (pentachlorphenol base) showed that chemical weed control in forests is both a practical and an economic possibility. Results are given in general terms only. - P.C. [267(43)]

90. SENTSCH, W. and UHLIG, S. (Inst. Fakultät für Forstwirtsch., Tharandt, E.Germany). Erste Zusammenkunft der sozialistischen Arbeitsgemeinschaft "Chemische Unkrautbekämpfung in Forstpflanzgärten" in Tharandt. [First meeting of the socialist work society "Chemical weed control in forest nurseries" at Tharandt.] Forst und Jagd, 1960, 10,(5), 233.

A report of a meeting to discuss the use of simazine, neburon, PCP and OMU (cyclo octyl dimethylurea in forest nurseries.- P.C. [269(43)]

91. (WEAR, S.) Pruning with a chemical. Western Fruit Gr., 1959, 13,(12),30.

MH at 500 p.p.m. was sprayed onto 2 groups of lemon trees, one of which had had the suckers pruned and the other suckers left unpruned. No substantial difference in behaviour was observed during the following 6 months. The spray did not kill suckers on the unpruned trees, but caused the tips to turn yellow and stop growing. It did not harm older leaves or limbs or cause fruit drop. - Hort.Abstr., 30,(4),5999.

BIOLOGY OF WEEDS AND POISONING BY WEEDS

92. GODWIN, H. (Univ., Cambridge, England). The history of weeds in Britain. Biology of Weeds, Symp.Brit.ecol.Soc., 1960, 1-10, bibl.16.

With reference to prehistoric times. - L.K. [O.W.]

93. BUNTING, A.H. (Univ., Reading, England). Some reflections on the ecology of weeds. Biology of Weeds, Symp.Brit.ecol.Soc., 1960, 11-26, tabs.3, bibl.29.

The subjects discussed are: (1) weeds and secondary successions (conditions for weed colonisation, reproductive ability, adaptation to the crop and physiological adaptation); (2) weed floras in areas of new agriculture (at Kongwa in Tanganyika and Tosi in the Sudan); (3) weeds and competition; (4) the uses of weeds and weeds as precursors of crops and (5) 2 appendix tables giving (a) the period of apparent entry into the British flora of certain dicotyledenous weeds of arable land and (b) common weeds at Kongwa. - L.K. [O.W.]

94. HARPER, J.L. (Univ., Bangor, N.Wales). Factors controlling plant numbers. Biology of Weeds, Symp.Brit.ecol.Soc., 1960, 119-32.

figs.4, tabs.1, bibl.16.
The factors considered are those determining: (1) the number of seeds of given weed species per unit area; (2) the number of viable seeds which germinate in any one year; (3) the numbers of germinating seeds which produce mature plants; and (4) the number of seeds produced by mature plants. Experiments with Papaver spp. and Agrostemma githago are described in which the relationship between density of non-dormant seeds sown and (a) the density of mature plants, (b) the number of capsules produced per ft^2, and (c) the number of seeds per capsule was examined, also an experiment in which the response of P. argemone to sowing density with and without wheat sown at 1.5 cwt/ac was compared. The conclusions drawn from results were: (1) A weed population which is at a density such that self-regulation of seed output occurs will have enormous resilience to change. (A reduction of an A. githago population by 90% if made at the seed or seedling stage may reduce its output by less than 10%). The smaller the population the proportionately more effective will its reduction become. Hence it may be attacked most effectively during the early phases of its spread. (2) The seed population bears no direct relationship to the density of weed infestation it will produce; this depends on the frequency with which individual seeds meet microsites suitable for establishment. The crop plays an important part in determining the frequency of such sites and may increase it. This is further evidence in favour of cleaning crops as opposed to open fallow for eradicating accumulated weed seeds. (3) Responses to density in which plasticity rather than mortality is responsible for population control, permit a wider range of genotypes to remain present in the population. - D.M.L.S. [O.W.]

95. THURSTON, J.M. (Rothamsted Exp.Sta., Harpenden, Herts, England). Dormancy in weed seeds. Biology of Weeds, Symp.Brit.ecol. Soc., 1960, 69-82, bibl.54.
Aspects considered are: periodicity and survival in cultivated soil, longevity of seeds in soil, mechanisms of dormancy and classifications of types of dormancy. - L.K. [O.W.]

96. WELLINGTON, P.S. (Off.Seed Test.Sta., Cambridge, England). Assessment and control of the dissemination of weeds by crop seeds. Biology of Weeds, Symp.Brit.ecol. Soc., 1960, 94-107, tabs.7, bibl.17.
A review of the existing situation in the U.K. - D.M.L.S. [O.W.]

97. WARBURG, E.F. (Dep.Bot., Univ.Oxford, England). Some taxonomic problems in weedy species. Biology of Weeds, Symp. Brit.ecol.Soc., 1960, 43-7, tabs.1, bibl.10.
Certain differences in the taxonomy of weeds when compared with non-weed spp. are briefly discussed, also the origin of certain weed spp. and it is suggested that a possible relationship between chromosome number, distribution and habitat might be worth investigating. - D.M.L.S. [O.W.]

98. BLEASDALE, J.K.A. (Nat.Veg.Res.Sta., Wellesbourne, Warwick, England). Studies on plant competition. Biology of Weeds, Symp.Brit.ecol.Soc., 1960, 133-42, figs.6, tabs.3, bibl.18.
Examples are given of the way in which the species, density, distribution and duration of weeds can affect the yield of some vegetable crops. Climatic and edaphic conditions are represented as having a modifying effect. It is concluded that it is reasonable to assume that plants can compete for the supply of nutrients, light or water either simultaneously or in rapid succession. Plant growth integrates this situation, thus justifying the use of plant weight as an index of competition. This enables competition to be defined and studied in quantitative terms. - Partly from Author's Summary. - D.M.L.S. [O.W.]

99. YAMADA, T. and HORIUCHI, S. (Div. Forage Crops, Nat.Inst.Agric.Sci., Chiba, Japan). On the bias of quantitative characters and the change of their distribution in a population due to inter-plant competition. Pap.read at 8th Internat. Grassl.Congr.1960, pp.5, figs.5, tabs.2, bibl.15. [O.W.]

100. de WIT, C.T., ENNIK, G.C., van den BERGH, J.P. and SONNEVELD, A. (Inst.voor Biol.en Scheik.Onderz.LandbGewassen, Wageningen, Netherlands). Competition and

non-persistency as factors affecting the composition of mixed crops and swards. Pap.read at 8th Internat.Grassl.Cong.1960, pp.6, figs.5,bibl.7.
A theory of the competition between plants in mixed crops and swards is given, with 5 possible models of competition. One model is that in which a reduction in crop production is caused by the presence of a weed. This model is used to evaluate the effect of Camelina sativa on the growth of Linum usitatissimum. The results did not indicate any significant deviations from linearity in seed yields when different ratios of seed numbers of the 2 species were sown in Mitscherlich pots. There was, therefore, no evidence that C. sativa produced any root exudate toxic to the growth of L. usitatissimum. - P.J.B. [O.W.]

101. BAKKER, D. and van der ZWEEP, W. (Biol.Dep.,N.E.Polder Works,Kampen, Netherlands). Plant migration studies near the former Island of Urk in the Netherlands. Acta Bot.Neerl., 1957, 6,60-73, figs.1, tabs.6,bibl.13.
The results are given of a study of the dispersal biology of species on reclaimed land in the vicinity of the Isle of Urk in the Zuijder Zee. - P.J.B. [205(492)]

102. BAKKER, D. (Biol.Dep.,Wieringermeer Authority,Kampen,Netherlands). A comparative life-history study of Cirsium arvense (L.) Scop. and Tussilago farfara L., the most troublesome weeds in the newly reclaimed polders of the former Zuiderzee. Biology of Weeds, Symp.Brit.ecol.Soc., 1960, 205-22, figs.2,tabs.9,bibl.18.
Comparisons of the following are included: dissemination by wind; seed viability; influence of temperature, depth of sowing, and water content and soil aeration on germination; influence of density, light intensity and water content and soil aeration on seedling growth; influence of some environmental factors on vegetative reproduction; reproduction by seed; and seed output.
It was shown that the rather late establishment from seed and the slow spread of C. arvense in the newly reclaimed polders is due to its susceptibility to badly aerated soils, the rather slow anthropochorous seed dissemination, and the scarcity of pollinating insects. The rapid establishment and spread of T. farfara is due to the availability of moist and bare soils, rapid anemochorous seed dissemination, and the large output of germinative seeds resulting from autogamy. Shading was proved to be unfavourable to both species,especially to seedlings. Ca. 35 000 ha of L. Flevoland have been sown with Phragmites communis shortly after emergence of the land from the water in order to prevent invasion by T. farfara, as P. communis can be more easily killed. - D.M.L.S. [O.W.]

103. VODERBERG, K. (Inst.Botanik der Landwirt.-Gärnterish.Fakultät,Humboldt-Univ., Berlin,Germany). Die Unkrautgesellschaften der Acker um Berlin, insbesondere der Rieselfelder. [Weed associations on fields round Berlin, with special reference to those irrigated with sewage.] Proc.Weed Conf. Berlin cent.biol.Inst., 1959, 9-13, (G.russ.e.)
Heavy irrigation with sewage effluent halved the number of weed species, chiefly by raising the soil pH. On the soils investigated, weeds could be classified into two main communities: (a) the Setaria viridis-Spergula arvensis association on non-irrigated soils, and (b) the Solanum nigrum-Sonchus oleraceus on irrigated soils. - P.C. [O.W.]

104. LAZENBY, A. (School of Agric.,Univ. Cambridge,England). Adaptability in Allium vineale. Biology of Weeds, Symp.Brit.ecol. Soc., 1960, 223-35, tabs.2,bibl.10.
Experiments are described in which the effect of plant disturbance, depth of planting, competition from Lolium perenne, different times of cutting, frequency of cutting + competition from L. perenne was studied. In the disturbance experiments plants were (a) pulled up and replanted and the soil watered regularly, and (b) pulled up and laid on the soil surface + soil watering. In the depth of planting experiments, bulbs, offsets, and bulbils were planted at depths of 0, 0.5, 1, 2, 4, 8 and 16 in. The results are analysed and the factors contributing to the plant's adaptibility to various conditions discussed. - D.M.L.S. [O.W.]

105. BATTET, A. (Bot.Dep.,Univ.Southampton, England). Some problems in Viola tricolor L. and its allies. Biology of Weeds, Symp.Brit. ecol.Soc.,1960, 55-60, bibl.5.
The validity of the distruction between V. tricolor and V. arvensis is discussed, also the nature of morphologically intermediate populations and their origin. - D.M.L.S. [O.W.]

106. LITTLE, E.C.S. (c/o Lloyds Bank, 6, Pall Mall, London, S.W.1., England). The ecology of some New Zealand woody weeds. Biology of Weeds, Symp.Brit.ecol.Soc., 1960, 176-83, bibl.15.
Notes on the ecology, importance as weeds or as potential weeds in New Zealand and control by chemical and/or biological means of the following: - Ulex europaeus, Cytisus spp., Lupinus arboreus, Rosa eglanteria, Salix spp., Pinus insignis, and Leptospermum scoparium. - D.M.L.S. [O.W.]

107. GAY, P.A. (Nature Conservancy, 19 Belgrave Sq., London, England). The water hyacinth and the Sudan. Biology of Weeds, Symp.Brit.ecol.Soc., 1960, 184-8, bibl.3.
The spread, and its implications, of Eichhornia crassipes in the Nile is considered. - L.K. [O.W.]

108. WEERARATNA, W.G. (Dep.Forestry, Univ.Oxford, England). The ecology and biology of parasitism of the Loranthaceae of Ceylon. Biology of Weeds, Symp.Brit. ecol.Soc., 1960, 189-202, bibl.40.
Species in Ceylon are listed under the 4 climatic zones. Host selection and specificity, the biology of infection (including dispersal, mechanism of invasion, haustorial systems, the water relations of host-parasite) are reviewed and the author's own observations noted. Viscum capitellatum has been recorded as a hyperparasite on Dendropthoe falcata suggesting potentialities of biological control. - D.M.L.S. [O.W.]

109. AL-AISH, M. Grass germination responses to isopropyl-phenyl carbamate and classification. Proc.9th Internat.Bot. Congr., Montreal, 1959, 3.
Responses to seed treatment with propham varied among genera, tribes and subfamilies and were related to systematic characters. In the Festucoideae, germination was completely inhibited while in most other groups it was stimulated. Reaction of the Phragmitiformes was varied. Treatment of dry seed with a 0.005% solution for 24 hours followed by washing in water allowed the Festucoideae and Panicoideae to be distinguished. - Plant Breed.Abstr., 30, (4), 3516 (modified). - D.M.L.S.

110. WELBANK, P.J. (Rothamsted Exp.Sta., Harpenden, Herts., England). Toxin production from Agropyron repens. Biology of Weeds, Symp.Brit.ecol.Soc., 1960, 158-64, bibl.2.
In experiments to test the production of toxins from Agropyron repens, young plants of barley, wheat, kale and tomato were treated with leachings of roots and rhizomes, and seedlings of rape and turnip were grown in close contact with living A. repens roots. There was no evidence of any appreciable growth inhibition by the grass; sometimes growth was stimulated. Extracts of A. repens root and rhizome residues incubated with soil inhibited germination and extension growth of rape seedlings, sometimes very strongly. The results indicate that, although there is no secretion of a toxin, inhibitors may arise from the decay of A. repens material in the soil. - Author's Summary. [O.W.]

111. SUNDERLAND, N. (John Innes Inst., Bayfordbury, Hertford, England). Germination of the seeds of angiospermous root parasites. Biology of Weeds, Symp.Brit.ecol.Soc., 1960, 83-93, figs.3, tabs.3, bibl.20.
The paper discusses the synthesis, chemical nature and mode of action of host stimulatory substances, the state of the parasite seed prior to stimulation, and the subsequent growth of the seedling. Reference is made in particular to Orobanche spp. including O. minor and to Striga hermonthica. - D.M.L.S. [O.W.]

112. HOUTMAN, G. Weg met het onkruid! Verarming van de fauna. [Away with weeds! Impoverishment of the fauna.] Natura, 1960, 57, (9), 133-4.
Some observations are made on the possible consequences of the impoverishment of the flora through the use of herbicides. - Landbouwdocumentatie, 1960, 16, M5690.

113. LEWIS, P.B. (Vet.Officer, Manjimup, W.Australia). Bracken poisoning in cattle. J.Agric.W.Aust., 1960, 1, (7), 655-6.
Discusses briefly the symptoms, cause and treatment. - D.M.L.S. [O.RE.]

114. ANISON, E.F., HILL, K.J., LINDSAY, D.B. and PETERS, R.A. Fluoroacetate poisoning in sheep. J.comp.Path., 1960, 70, 145-55.
Poisoning may result from ingestion of the South African plant Dichapetalum cymosum. - From Vet.Bull., Weybridge, 30, (6), 340. - D.M.L.S.

115. ALLEN, J.R., CHILDS, G.R. and CRAVENS, W.W. (Dep.Path.,Univ.Wisconsin School Medicine,Madison,Wis.,U.S.A.) Crotalaria spectabilis toxicity in chickens. Proc.Soc.exp.Biol.N.Y., 1960, 104,(3), 434-6, figs.3,tabs.1,bibl.7.
In feeding trials, concentrations of C. spectabilis in the diet in excess of 0.3% were shown to be lethal; concentrations of 0.05-0.2% caused marked reduction in weight gain. P.M. findings are described. - D.M.L.S. [O.R.]

116. SENIOR, V.E. Algal poisoning in Saskatchewan. Canad.J.comp.Med., 1960, 24,26-31.
Surface scum and algae which had been piled by the wind at the edge of lakes is held responsible for fatalities to dogs and sickness and mortality in horses and cattle. Toxic algal types were identified by microscopic examination and the toxicity of the water confirmed by intraperitoneal inoculation into mice. The P.M. findings were at variance with present knowledge in regard to the nature and action of the toxin and to some extent at variance with those reported by other workers. It is suggested that laboratory research using a single species of alga with mice as the sole test animal is unlikely to give results comparable to the consumption by a cow or dog of a massive quantity of so-called water bloom, comprising a variety of potentially toxic types. - From Vet.Bull.,Weybridge, 30, (5),269. - D.M.L.S.

AQUATIC AND WOODY WEEDS AND THEIR CONTROL

117. WIERSEMA, P. (Consulentschappen Doetinchem en Hengelo,Netherlands). Onkruiden in en langs watergangen. [Weed control in and along waterways.] Landbouwmechanisatie, 1960, 11,(4),259-61, 263, figs.5.
Recommendations are made for the control of weeds in ditches, on the basis of the results of trials in East Gelderland in 1958-9. Systemic herbicides gave the best results; root-acting herbicides were only effective when applied to the bottoms of dried-out ditches for the control of germinating plants. For grassy weeds, 10-20 kg/ha dalapon was recommended and for dicots, 1 kg a.i. 2,4-D or 2 kg a.i. MCPA/ha plus 3-4 kg 2,4,5-T where stands of nettles [Urtica dioica] or brambles were heavy. Spray volumes of 300-1000 l/ha were necessary. In the initial year of treatment, the first application should be made in mid-May and a second in August. - P.J.B. [208(492)]

118. van der WEIJ, H.G. (I.B.S.Weed Control Dep.,Wageningen,Netherlands). Chemical control of weeds in and along waterways. Proc.5th Brit.Weed Control Conf. 1960, pp.6,bibl.12.
Aspects reviewed included the control of emergent and submerged aquatic weeds and of weeds on ditchbanks and in temporarily dry ditches. The relation of aquatic weed control to the maintenance of a proper balance between weed growth and fish life and its implications for fish life in general are also discussed. - P.J.B. [O.W.]

119. WIERSEMA, P. Onkruidbestrijding in sloten. [Weed control in ditches.] Tijdschr. PlZiekt., 1960, 66,129.
Contains the information that Apium nodiflorum showed little sensitivity to 2,4-D and MCPA. In trials with dalapon, it was shown that for control of Glyceria sp., 2 treatments were needed; the weed was most susceptible when standing in water. Phalaris sp. was killed by dalapon at 5-8 kg/ha. To clear ditches in the first year of treatment, dalapon 10-15 kg/ha + 2,4-D or MCPA in May followed by dalapon 5-10 kg + 2,4-D or MCPA in August, in 300-500 l spray, was necessary In the second year, one treatment only with dalapon at 5-10 kg/ha + 2,4-D or MCPA in June or July was considered necessary. - P.J.B.

120. CHANCELLOR, R.J. (A.R.C.Weed Res.Org., Begbroke Hill,Oxford,England). Experiments on the chemical control of emergent water plants. Proc.5th Brit.Weed Control Conf.1960. pp.9, tabs.3,bibl.4.
The results are given of 9 experiments, mostly with dalapon sodium, on the control of emergent aquatic weeds, which indicated that dalapon had a useful selective effect in reducing the proportion of large species while permitting an increase in stands of relatively small, resistant species. Rates of dalapon 10-40 % a.e. gave satisfactory control of important emergent weeds, though occasional exceptions were noted. In these experiments, observations were made of the sensitivity to dalapon of a wide range of species, on the basis of which they were grouped into the following categories: S = susceptible, MS = good control

with rates of 10-40 #, MR = no effective control with 10-40 #, R = unaffected. The species are given as follows: Alisma plantago-aquatica R, Apium nodiflorum R, Butomus umbellatus R, Callitriche sp. R, Caltha palustris R, Carex pseudocyperus S, Carex spp. S-MS-MR, Dipsacus fullonum ssp. sylvestris R, Epilobium hirsutum R, Equisetum fluviatile R, Filipendula ulmaria R, Galium palustre R, Glyceria fluitans S-MS, Glyceria maxima S-MS-MR, Hydrocharis morsus-ranae R, Impatiens capensis R, Iris pseudacorus MS-MR, Juncus effusus S, Lemna gibba R, Lemna minor R, Lysimachia vulgaria R, Lythrum salicaria R, Mentha aquaticaR, Menyanthes trifoliata R, Myosotis palustris ssp. palustris R, Nasturtium officinale R, Nuphar lutea R, Oenanthe fistulosa R, Oenanthe fluviatilis R, Phalaris arundinacea MS, Phragmites communis S-MS-MR, Polygonum amphibium R, Polygonum hydropiper R, Potamogeton natans R, Ranunculus lingua R, Ranunculus repens R, Rumex conglomeratus R, Rumex hydrolapathum R, Sagittaria sagittifolia R, Schoenoplectus lacustris S-MS, Scrophularia nodosa R, Scutellaria galericulata R, Sium latifolium R, Solanum dulcamara R, Sparganium ramosum S-MS-MR, Stachys palustris R, Stellaria palustris R, Typha angustifolia S, Typha latifolia S, Veronica catenata R. - P.J.B. [O.W.]

121. CHANCELLOR, R.J. (A.R.C.Weed Res.Org., Begbroke Hill, Oxford, England). Results of some preliminary experiments on the use of pelleted herbicides for controlling submerged water plants. Proc.5th Brit.Weed Control Conf.1960, pp.8, bibl.5.

In trials in which a wide range of relatively insoluble pelleted herbicides were applied to small plots in flowing or nearly static water, no material gave satisfactory control of submerged aquatic weeds. The contrast between these results and other results obtained in the U.S.A. is discussed. - P.J.B. [O.W.]

122. STOVELL, F.R. (Shell Chem.Co., Ltd. Gt.Marlborough St., London, W.1, England). A progress report on the development of aquatic weed control. Proc.5th Brit.Weed Control Conf.1960, pp.6, bibl.6.

The results of 5 trials in 1960 indicated that concentrations of 10 p.p.m. acrolein at 60°F would kill Callitriche sp., Chara sp., Elodea canadensis, Myriophyllum sp., Potamogeton pectinatus, P. natans, Alisma sp. and large plants of Hippuris vulgaris and Sparganium sp. Treatment of one-eighth of the area of a lake well stocked with fish gave excellent control of the weeds present with no apparent toxicity to the fish. In trials at 2 locations in 1960 in static water, pelleted 2,4-D was applied in late August or early September at a rate of 30 # a.e. in the form of 6% clay pellets or 80% resin-based pellet formulations. Weeds present included Myriophyllum sp., Alisma sp., Callitriche sp., Chara sp., Elodea canadensis, Lemna minor and algae. By mid-October, there was some regrowth of Callitriche sp., but otherwise all weeds were dead. The resin-based pellets appeared to have advantages in use over the clay pellets. - P.J.B. [O.W.]

123. PROCTOR, J.M. (N.A.A.S., Eastern Region, Cambridge, England). Chemical control of weeds in farm dykes 1959 and 1960. Proc.5th Brit.Weed Control Conf. 1960, pp.4, tabs.1, bibl.4.

In trials in 1959, injecting the water in dammed dykes on 26th May with acrolein to given concentrations of 15, 30 and 60 p.p.m. gave excellent control of most broad-leaved aquatic weeds and Sparganium ramosum, but regrowth was rapid. Treatment of undammed dykes was ineffective. Applications of simazine and atrazine at 20 # as 50% wettable powders made on 26th May, 1959 to drained, marshy-bottomed ditches, gave a complete kill of a wide range of species and the effects lasted for more than 16 months. Trietazine was ineffective as also was atrazine applied to standing water. Applications of 2,4-D pellets at 30 # a.e. on 26th May, 1959 to a dammed dyke gave very good control of Alisma sp. and Sparganium sp. and markedly reduced the growth of submerged species. Applications made to drained, marshy-bottomed ditches or to undammed dykes were ineffective. In further trials in 1960, pelleted 2,4-D was again effective on sites where water flow was nil. At a trial in Norfolk on a dyke blind at one end, Callitriche sp., Alisma sp. and Sparganium sp. treated with pelleted 2,4-D on 18th August were almost completely dead by 20th September; Potamogeton natans was not apparently affected. The 2,4-D pellets in these trials were relatively slow acting. Applications of 2 cwt of a pelleted "complete" weedkiller mixture containing monuron 10 # on 26th May, 1959 gave good control of Typha latifolia on a drained, marshy-bottomed dyke; in standing water the herbicide was ineffective. - P.J.B. [O.W.]

124. ALLSOPP, W.H.L. (Fisheries Lab., Dep.Agric., P.O.Box 174, Georgetown, British Guiana). The manatee: ecology and use for weed control. Nature, Lond., 1960, 188, (4752), 762.
A note is given on the potentialities of manatees (Trichechus manatus) for controlling aquatic weeds in tropical regions. Manatees are reported to have kept reservoirs in British Guiana free from aquatic plants such as Cabomba aquatica, Anacharis sp., Leersia sp. and Utricularia sp. and to have controlled grasses, Nymphaea sp., Nelumbo sp. and Eichhornia crassipes in ditches. In trials during 1959-60, two manatees each 7.5 ft long cleared the weeds from a canal 22 ft wide and 1600 ft long in 17 weeks. Manatees are described as not numerous, slow to reproduce, very docile and harmless to other aquatic fauna. - P.J.B. [O.W.]

125. IVENS, G.W. (A.R.C.Weed Res.Org., Begbroke Hill Farm, Oxford, England). Species of Acacia as weeds. Biology of Weeds, Symp.Brit.ecol.Soc., 1960, 167-75, bibl.17.
Acacias of importance in E. Africa are listed according to size, and the problem of their encroachment into grassland and their control by management methods and by chemicals discussed. Light stocking rates combined with periodic burning when trees are most vulnerable and the grass least sensitive can provide effective control. 2,4,5-T is the most effective of chemicals tested. - D.M.L.S. [O.W.]

126. ALLMAN, J.M. and SYLVESTER, E.P. (Iowa State Coll., Ames, Iowa, U.S.A.) Effects of time and method of treatment on tree kill and bluegrass recovery. Proc.Iowa Acad.Sci., 1959, 66, 103-12, figs.3, tabs.3, bibl.6.
In trials in Iowa, a stand of box-elder trees (Acer negundo) on a neglected bluegrass (Poa pratensis) pasture was cut at 3 in. and at 1 ft, and sprayed with a 2,4-D/2,4,5-T mixture 1:5 at 0.25 gal in 5 and in 10 gal fuel oil. Resprouting from stumps cut at both levels and in 4 different seasons was controlled by both concentrations. Basal treatment of standing trees gave 100% kill with the 1:5 mixture. Yields of blue-grass were about 60% greater in the cleared blocks. Low-cut treated stumps with tree removal gave best control of sprouting, and of weeds and also improved yields of blue grass. - P.C. [45(77.7)]

127. * YAJIMA, Y., IMAGAWA, T. and UNO, T. [Studies on the control of trees, shrubs, brushes and weeds in waste land and the effect of 2,4,5-T butyl ester.] Gifu U. Facul.Agric.Res.E., 1958, 9, 12-20, (Jap.e.)

OTHER WEEDS AND THEIR CONTROL

See also 3,4,5,6,8,9,10,70,94, 110,111,148.

128. SAGAR, G.R. (Dep.Agric.Bot., Univ. Coll.N.Wales, Bangor, N.Wales). Agropyron repens - an introduction. Proc.5th Brit. Weed Control Conf.1960, pp.5, bibl.4.
The biology of A. repens is discussed in relation to those aspects which might affect the success of chemical and cultural control measures. - P.J.B. [O.W.]

129. PROCTOR, J.M. (N.A.A.S., Eastern Region, Cambridge, England). Rotary cultivation for the control of couch. Proc.5th Brit.Weed Control Conf.1960, pp.4.
The results are given of 2 trials in 1959 on light silt soil infested with Agrostis gigantea and to a lesser extent with Agropyron repens. In the dry conditions of this year, rotary tillage up to 3 times with intervals of 1 month gave fair control of these species, though not where tractor power was inadequate. Applications of dalapon 3 and 6 lb, TCA 10 and 20 lb and activated amitrole 2 and 4 lb improved the effectiveness of rotary cultivation, but not sufficiently to repay the cost of treatment. Rotary tillage by itself gave better control than herbicidal treatments alone. Of herbicides used, activated amitrole was the most effective. - P.J.B. [O.W.]

130. JEATER, R.S.L. and McILVENNY, H.C. (Jealott's Hill Res.Sta., Bracknell, Berks, England). The control of perennial grasses with dipyridyl herbicides alone and in mixtures. Proc.5th Brit.Weed Control Conf. 1960, pp.4, tabs.5, bibl.2.
In tests with Agropyron repens the leaves of shoots at the 2- to 3-leaf stage at one end of active rhizomes were painted with diquat or dalapon alone or in mixtures, or with either PP.910 (1,1'-dimethyl-4,4-dipyridylium dimethosulphate) or diquat in mixtures with amitrole alone or in mixtures. At 3 months after treatment there were no aerial shoots present where mixtures of 0.5 or 1 mg diquat + 5 or 7.5 mg dalapon/100 ml,

or 0.5 mg diquat + 2.5 mg amitrole/100 ml were used. Older plants with shoots at the 4- to 6-leaf stage were sprayed with diquat 1 %, PP.910 1 %, dalapon 5 and 10 % and amitrole 2.5 and 5 % and received each herbicide alone, or diquat or PP.910 in combination with dalapon or amitrole. At 10 weeks after spraying, all shoots sprayed with dalapon + diquat or dalapon + PP.910 were killed and there was no regrowth. With dalapon alone, all sprayed shoots were dead, but regrowth occurred. Shoots treated with diquat had by this time recovered completely. At 5 months after spraying, excellent control of top growth was secured with PP.910 alone or + amitrole; at 1 year after spraying, plants sprayed with PP.910 and with PP.910 + low rates of amitrole produced some regrowth, while those sprayed with PP.910 + the higher rate of amitrole or with amitrole alone were completely killed. In field trials, top kill following treatment in spring was greater with dalapon + PP.910 or diquat than with either component alone, but subsequent regrowth with the mixtures was similar to that with dalapon alone. The addition of wetters improved the effectiveness of diquat and PP.910. - P.J.B. [O.W.]

131. EVANS, S.A. (A.R.C.Weed Res.Org., Begbroke Hill, Oxford, England). Dalapon for the control of couch (Agropyron repens, Agrostis gigantea and Agrostis stolonifera). Proc.5th Brit.Weed Control Conf.1960, pp.5, tabs.1, bibl.1.

Summarised results are given of 17 farm trials carried out at different locations during 1957-9, in which dalapon at 4-20 % a.e. was used to control Agropyron repens, Agrostis gigantea and Agrostis stolonifera. The results indicated that dalapon was erratic in its effect in these trials. It was not possible to deduce any reasons for its lack of effectiveness. In limited trials, split applications of dalapon, pre-treatment with N and rolling before or after spraying had no material effect on the results. - P.J.B. [O.W.]

132. HOLLY, K. and CHANCELLOR, R.J. (A.R.C.Weed Res.Org., Begbroke Hill, Oxford, England). The response of Agropyron repens to amino triazole. Proc.5th Brit.Weed Control Conf.1960, pp.6, figs.2, tabs.3, bibl.3.

In pot experiments, there was evidence that the addition of NH_4SCN enhanced the herbicidal effect of amitrole against A. repens; rates as low as 0.25 % markedly suppressed the growth of A. repens rhizomes. It was thought that the activating effect of NH_4SCN was not due to any effect on the penetration of amitrole, but was involved in a later phase of its phytotoxic effect. In field trials, amitrole + NH_4SCN was not so effective as in the pot trials. Possible reasons for variations in the effectiveness of amitrole are discussed. Thiourea had no activating effect on amitrole and the efficiency of amitrole was reduced by admixture with contact herbicides such as PCP, diquat and dinoseb. - P.J.B. [O.W.]

133. PEDERSEN, H.E. Kvik. [Couch grass (Agropyron repens).] Landbonyt, 1959, 13, (9), 324-6, (Dan.)

Mechanical and herbicidal means of controlling A. repens under Danish conditions are reviewed briefly. - P.J.B. [104(489)]

134. ORCHARDIST OF NEW ZEALAND. Control of couch grass. Orchard.N.Z., 1960, 33, 84.

Control of couch grass [Agropyron repens] was obtained by using TCA at 4 oz/tree without injury to peach and plum trees, but leaf chlorosis and necrosis occurred on apricot trees. Dalapon 5 or 10 % allowed only weak regrowth without tree injury. - Hort.Abstr., 30 (4), 5245.

135. PROCTOR, J.M. (N.A.A.S., Eastern Region, Cambridge, England). Control of reeds (Phragmites communis) in arable land with dalapon. Proc.5th Brit.Weed Control Conf.1960, pp.3.

From the results of limited trials, it was concluded that dalapon 15 % a.e. could be expected to give good control of P. communis in arable fields on fen peat soils when applied to a good growth of foliage. Applying dalapon to cereal stubbles appeared the most suitable procedure. - P.J.B. [O.W.]

136. CONWAY, E. (Bot.Dep., Univ.Glasgow, Scotland). Considerations in judging control methods of Pteridium aquilinum. Proc.5th Brit.Weed Control Conf.1960, pp.2, tabs.2, bibl.2.

Bracken rhizomes are divided into the following 3 categories: (a) deep-running rhizomes mainly responsible for its spread, (b) relatively thin, small branches near the soil surface which are the rain frond-bearing branches, and (c) intermediate branches linking (a) and (b), which are capable of developing into either type. The development of rhizomes at a number of different areas in N. England and W. Scotland

is reviewed and the existence of wide variations from site to site stressed. In trials at not less than 5 sites for each treatment, bracken stands were subjected to cutting twice (late June and early August), or foliar applications of 4-CPA butoxyethanol ester 10 % a.e. in early July. Data are given of the effect of these treatments on stem apices and frond-buds of rhizomes in September of the year of treatment. Cutting did not kill the growing points of rhizomes, though development was slowed down. 4-CPA caused severe injury to the apical tissues of axes adjacent to the current year's fronds, i.e. adjacent to the point of application of the herbicide, but damage to type (b) branches was less. 4-CPA was carried with ease to the apices of axes on which treated fronds were borne, but to a much smaller extent in a basal direction. Frond counts made in the years after treatment reflect the number of frond buds that escaped damage and hence the ultimate effectiveness of the treatment. - P.J.B. [O.W.]

137. NICHOLSON, I.A. (Hill Mng Res.Org., Edinburgh, Scotland). Economic aspects of bracken (Pteridium aquilinum) in upland farming. Proc.5th Brit.Weed Control Conf. 1960, pp.6, bibl.22.

The origins and extent of bracken infestations in Great Britain are discussed and costs of mechanical clearance are outlined. The necessity for improved management practices in conjunction with bracken eradication programmes is stressed. - P.J.B. [O.W.]

138. HODGSON, G.L. (A.R.C.Weed Res.Org., Begbroke Hill, Oxford, England). Dalapon, 4-CPA and amitrole forthe control of bracken - an interim report. Proc.5th Brit.Weed Control Conf. 1960, pp.6, tabs.4, bibl.6.

The results are given of trials in the very dry year of 1959 in which dalapon at 10 and 20 % a.e., 4-CPA nonyl ester at 5 and 10 % a.e., and activated amitrole (activated with ammonium thiocyanate in a ratio of 100:95) at 10 and 20 % were applied in 20 gal spray at 2 dates in 13 trials. In 5 trials, 4-CPA butyl ester and a 4-CPA ester formulated as an invert emulsion were used at 10 %. Each trial was assessed during 14th-30th June and again during 8th August-9th September, 1960. Dalapon delayed frond emergence, but did not markedly decrease in frond density and was very variable in its effect. Grasses were completely killed by both rates of application. The 3 ester formulations of 4-CPA were similar in effect, but all were markedly less effective than in previous trials. It was concluded that until further knowledge of the cause of this seasonal variation in effectiveness was forthcoming, 4-CPA could not be regarded as a reliable means of controlling bracken. Applications of activated amitrole made in June or July reduced frond numbers at the second date of assessment by 70-85% at all locations except one. Delaying treatment until late August to early September resulted in poor control in all cases. Differences in control between the 2 rates used were slight, indicating that rates lower than 10 % would be effective. - P.J.B. [O.W.]

139. ERSKINE, D.S.C. (Edinburgh School Agric., Scotland). An interim report on bracken control trials. Proc.5th Brit.Weed Control Conf. 1960, pp.5, tabs.3.

In a trial in 1959, 4-CPA nonyl ester and diethanolamine salt at 7.5 % in 50 gal spray were applied at successive weekly dates from 30th June to 23rd September. As determined at assessments made in July, 1960, the optimum date of application was early August at the stage when the fronds were fully open, though relatively good results were obtained over a 4 week period at this time. The ester gave better control than the amine salt. In a second trial, dalapon at 5, 10, 15 and 20 %, activated amitrole at 5, 7.5, 10 and 15 %, 4-CPA nonyl ester at 7.5 and 10 %, 4-CPA butyl ester at 6 and 8 % and 4-CPA amine at 7.5 and 10 % were each applied in 1959 in 40 gal spray at the optimum recommended growth stage of bracken. Assessments were made in July and August, 1960. The 2 highest rates of dalapon killed the grass sward and were not markedly effective against the bracken. 4-CPA amine was effective and activated amitrole gave a very high degree of control. In field-scale trials at 3 locations in 1959, dalapon 15 %, amitrole 7.5 %, 4-CPA nonyl ester 7.5 % and 4-CPA butyl ester 6 % were used. Frond reduction percentages taken in August, 1960 showed outstanding results for amitrole at 2 out of 3 locations, while the 4-CPA formulations were again relatively ineffective. - P.J.B. [O.W.]

140. KIRKWOOD, R.C. (West of Scotland Agric. Coll., Auchincruive, Ayr, Scotland). The control of bracken - a progress report on herbicide and post-spraying management trials. Proc.5th Brit.Weed Control Conf. 1960, pp.7, tabs.6, bibl.6.

Trials were carried out at 2 locations in Scotland in 1959 in which bracken was treated with the following in 20 gal spray/ac: dalapon 10 and 20 % a.e., amitrole 10 and 20 %

a.i., amitrole + sodium thiocyanate 10 and 20 lb a.i. and 4-CPA ester at 5 and 10 lb. Weather at the time of spraying was warm and sunny, treatments were made at the end of July and the end of August, 1959, and assessments of kill made in mid-July, 1960. At one location, dalapon and amitrole + NH_4SCN significantly reduced frond density, reductions being greatest for the higher dosage rates and earlier spraying date. At the second location, no treatment significantly reduced frond density, while amitrole increased density. In box and field studies on the effect of litter removal and fertiliser treatments on the germination and establishment of herbage species in sprayed bracken stands, removal of litter by fire or raking had little effect on establishment, whereas applying molasses significantly increased yields 6 months later. - P.J.B. [O.W.]

141. NORRIS, J. (A.H.Marks & Co.,Ltd., Wyke,Bradford,Yorks,England). Some aspects of the chemical control of bracken (Pteridium aquilinum). Proc.5th Brit. Weed Control Conf.1960,pp.8, tabs.11, bibl.2.

The results are given of a number of trials on the herbicidal control of bracken, mostly with 4-CPA applied as low-volatility ester formulations containing 5 lb 4-CPA/gal in 20-100 gal spray/ac. At dosage levels of 4-CPA 5-10 lb, a high proportion of frond buds associated with current emerged frond growth were destroyed. Frond buds attached to older rhizomes where the herbicide was required to be translocated over relatively long distances suffered only 50-90% kill. The results indicated that it is not possible to obtain consistently complete or nearly complete control of bracken with 4-CPA. Where rates of 5, 7.5, 10, 15 and 20 lb 4-CPA were used, rates greater than 10 lb did not result in commensurately increased kill. Spray volume rates of 20 and 50 gal/ac did differ significantly in effectiveness, and 100 gal reduced control in some cases. The use of 2 or 3 applications of 4-CPA at low rates during the same season in most cases resulted in poorer control than where the same total amount of 4-CPA was applied on one date. Spraying when the fronds were 50-70% infurled gave much more severe leaf scorch than spraying at later stages, but bracken was most susceptible at the fully expanded stage. In trials with different esters of 4-CPA in different oil/water emulsifier systems, no significant differences in effectiveness between them were noted. The efficiency of amine formulations of 4-CPA was much reduced by rain after application, or when applied to wet foliage; under such conditions, invert formulations of 4-CPA gave much better results than oil-in-water types. P.J.B. [O.W.]

142. ALLO, A.V. (Dep.Agric.,Tauranga, New Zealand). Scotch broom controlled by mowing after poor results from spraying. N.Z.J.Agric., 1960, 101,(4),407-8.

Mowing 1-year-old Cytisus scoparius in autumn caused over 90% kill 8 months later and was more effective than spring mowing. 2,4-D (ethyl ester) 1.3 lb in spring applied to broom 6-12 in. high gave very poor results and 2,4,5-T (butyl ester) 0.4-2 lb in autumn on broom ca. 2 ft high obtained no more than 60% control at the highest rate. Younger plants about 12 in. high were less well controlled by autumn mowing than the older, but results were better than those from the chemicals. Sheep grazing when plants were 3-4 in. high failed to kill the broom. - D.M.L.S. [O.RE.]

143. McCALEB, J.E., DAUTMAN, C.L. and HODGES, E.M. (Range Cattle Sta.,Ona, Florida,U.S.A.) Progress in palmetto control. Res.Rep.,Fla, 1961, 6,(1),11 and 17, tabs.1.

In trials begun in Florida in 1956, 5 herbicides were applied [presumably in August] to Serenoa repens on rangeland. Dalapon and erbon caused marked injury to the range grasses and some degree of soil sterilisation. 2,4,5-T butoxy ethanol ester 4 lb a.i., 2,4,5-TP 4 lb a.i. and 2,4-D butoxy ethanol ester 6 lb a.i. were considered best in terms of control of S. repens and Ilex glabra, and lack of injury to desirable forage species. Best control of S. repens (75%) was given by 2,4,5-T in a water carrier and increasing the proportion of oil in the carrier reduced its effectiveness as also was the case with 2,4,5-TP. The effectiveness of 2,4-D, however, was increased by adding oil. The ground cover of grass and grass-like plants decreased as the proportion of oil increased with 2,4,5-T and 2,4,5-TP; with 2,4-D the opposite was the case. - P.J.B. [O.W.]

144. WILLIAMS, J.R. (Sugar Res.Inst., Reduit,Mauritius). The control of black sage (Cordia macrostachya) in Mauritius: the introduction, biology and bionomics of

a species of Eurytoma (Hymenoptera, Chalcidoidea). Bull.Ent.Res., 1960, 51, (1), 123-33, figs.6, bibl.3.
The insect, which destroys the seed of C. macrostachya, was introduced in 1949 to supplement the activity of the leaf-feeding beetle Schematiza cordiae, which had achieved a high degree of control. It is difficult to assess the contribution made by Eurytoma. - D.M.L.S. [O.R.]

145. RASATHURAI, M. Lalang - to oil or not to oil. Planter, Kuala Lumpur, 1960, 36, 76-7, 87.
The following are recommended as alternatives to sodium arsenite for the eradication of lalang grass [Imperata cylindrica] on rubber estates: (1) 2 sprays + a final spot spray of a 15% emulsion of diesel oil in water, prepared using ammonium oleate, fortified with TCA (sodium) 2% and PCP (sodium) 1%, at 100 gal/ac after slashing; (2) monuron at 80 lb; (3) TCA (sodium) 261 lb in 1 application or 3 applications at 5-week intervals of weaker solutions; and (4) sodium chlorate applied repeatedly at 25 lb, to which calcium chloride and sodium borate may be added to reduce fire risk. - Hort.Abstr., 30, 5308, (modified). - D.M.L.S.

146. PETERSEN, H.I. Årsoversigt for Statens Ukrudtsforsøg 1958. [Annual review of (Danish) State Weed Control Research, 1958.] Tidsskr.f.Planteavl., 1960, 63, (5), 837-47, (Dan.e.)
Trials with allyl alcohol indicated that it could kill dormant as well as germinating weed seeds in the soil. The seeds of some weeds, including Chenopodium album, showed resistance. The results of an extensive questionnaire indicated that the yellow, cruciferous weeds and Cirsium arvense, while regarded as the most troublesome weeds, were declining in frequency, while Agropyron repens, Chrysanthemum segetum, Polygonum spp., Galium aparine, Galeopsis spp. and Anchusa arvensis were increasing. - P.J.B. [O.RE.]

CHEMISTRY, PHYSICS, TOXICOLOGY, RESIDUES AND SOILS

See also 50.

147. ALLEN, H.P. Diquat - a review of research and development with this compound, 1955-1960. Proc.5th Brit.Weed Control Conf.1960, pp.5, bibl.3.
Aspects reviewed include the mode of action of dipyridyl quaternary salts and the field uses of diquat. It is reported to have shown promise as an algicide. - P.J.B. [O.W.]

148. BAINSLEY, G.E. (Shell Research Ltd. Woodstock Agric.Res.Kent., Kent, England). An assessment of the new herbicide 2,6-dichlorobenzonitrile. Proc.5th Brit.Weed Control Conf.1960, pp.19, tabs.21, bibl.5.
In initial trials in 1959 and 1960, 2,6-DBN was highly toxic to germinating seeds, both in vitro and in sterilised soil the margin of selectivity was relatively narrow. With unimbibed seeds, however, dicotyledonous species were markedly more tolerant to 2,6-DBN vapour than monocotyledons. In field trials with some 30 weed species [not specified], the seed of more than half of them was killed by a rate of 1 lb and none survived 3 lb. Potato tubers dusted with 1 g 2,6-DBN/ton showed marked sprout inhibition, as did Salvinia auriculata plants treated with 1 p.p.m. concentrations. 2,6-DBN was applied at rates of 0.1-0.8 lb as a soil drench to Agropyron repens in the early stages of bud growth and with Aegopodium podagraria rates of simazine 2-16 lb were compared with similar rates of 2,6-DBN. Sensitivity to 2,6-DBN in plants tended to be lower in woody than in herbaceous species and to decline with maturation. In trials with crop species carrots, sugar beet and cabbage at early growth stages were injured by <2 lb, while leeks, onions, celeriac, tomato and sweet corn tolerated a rate of 3 lb thus giving a useful measure of post-em. weed control. Gooseberries and blackcurrants appeared to tolerate a rate of 4 lb, though such factors as formulation, method of application and subsequent cultivation affected this. The seedlings of a wide range of weeds suffered virtually complete kill following treatment with 2,6-DBN as a soil drench at 1 lb. Polygonum convolvulus showed severe damage after treatment with 1.5 lb and Raphanus raphanistrum was killed by this rate. In field trials, much higher dosages were required to give a similar measure of control; 3 lb followed by 0.25 in. rainfall was highly effective, while 8 lb followed by drought was ineffective. In the latter trial, granular formulations were markedly superior to the spray. Under temperate conditions when sprayed on to dry soil, 2,6-DBN had a half-life of approximately 2 days, but only of a few hours under tropical conditions. Light overhead irrigation or cultivation after spraying increased the persistence of the herbicide; in a number of experiments [not reported], cultivation reduced the rate of loss by volatilization by a factor of 4. - P.J.B. [O.W.]

149. GYSIN, H. and KNUSLI, E. (Geigy & Co., Basel, Switzerland). Chemistry and herbicidal properties of triazine derivatives. Adv. in Pest Control Res., 1960, 3, 289-353, bibl. 122.

The synthesis of triazine derivatives, analytical methods for determining the active ingredient content of technical samples and of small quantities of triazine herbicides are reviewed. The herbicidal properties of the following are considered in detail: (a) 2,4,5-trihalo-s-triazines, (b) 2,4-dichloro-6-substituted-s-triazines, (c) 2-chloro-4-amino (or alkylated amino)-6-alkylated amino-s-triazines, (d) N-arylated and N-aralkylated 2-chloro-4,6-diamino-s-triazines, (e) 2-bromo-4,6-bis(alkylated amino)-s-triazines, (f) 2-chloro-4-alkylated amino-6-alkoxy-s-triazines, (g) 2,4,6-trialkoxy-s-triazines and mercapto analogues, (h) 2,4,6-tris-(alkylated amino)-s- triazines, (i) 2-alkoxy-4,6-bis-(alkylated amino)-s-triazines and mercapto analogues, (j) 2,4-dialkoxy-6-alkylated amino-s- triazines, and (k) 4,6-bis (alkylated amino)- and 2-alkyl-4,6-bis-(alkylated amino)-s- triazines. The pharmacological and toxicological properties of triazines are briefly noted and there are sections on the mode of action of triazine derivatives, the metabolism of simazine in plants and the behaviour of simazine in the soil. - P.J.B. [O.W.]

150. FERENCZY, L. and MATKOVICS, B. (Dep. Plant Phys., Univ. Szeged, Hungary). A new possibility of producing superselective herbicides. Acta biol. Hung. suppl., 1959, 10, Suppl. 3, 30.

It has been observed that some auxin precursors (i.e. 3-indoleacetonitrile, 3-indoleethylamine) exhibit a selective growth promoting effect. On the basis of the selectivity of indole derivatives as auxin precursors it was thought that probably derivatives of 2,4-D would also possess a selective effect. If this proved true, as preliminary studies indicate, it would be possible to produce superselective herbicides, i.e. compounds able to control selectively dicotyledonous weeds in dicotyledonous crops.

Nine dicotyledonous crop plants 3 weeks old were sprayed with dichlorophenoxyacetonitrile (2,4-DN), 2,4-dichlorophenoxyethylamine (2,4-DEA) and 2,4-D at 500 g/ha. 2,4-D killed all the plants within 2-3 weeks. 2,4-DN had a similar effect except that cucumbers were only slightly and temporarily injured. 2,4-DEA had no effect on hemp [Cannabis sativa] but killed all the other plants.

2,4-DEA-HCl was synthesized and showed an effect identical with that of 2,4-DEA. At 1 kg/ha 2,4-DEA-HCl caused no injury to 8 hemp varieties and gave good control of Convolvulus arvensis, Amaranthus albus, A. retroflexus, Cardaria draba and Sinapis arvensis. - D.M.L.S. [O.R.]

151. LAIBE, R.C. (Oregon State Coll., Oregon, U.S.A.) The influence of temperature, moisture and method of application on the fungitoxicity of Mylone and Vapam. Ph.D. Thesis, Ore. State Coll., 1960, pp. 83, Microfilm $2.50, Xerox $4.40.

The toxicity of Mylone [DMTT] and Vapam [SMDC] to Verticillium albo-atrum and Phytophthora cinnamomi in soil was evaluated at 10, 15, 20 and 25°C and at 50, 100 and 200% of field moisture capacity, using 3 methods of application - as a soil drench, incorporation and injection. SMDC and DMTT, when applied to soil infested with V. albo-atrum microsclerotia, diffused through the soil and a moderate % of microsclerotia were killed within 12 hours. Maximum fungitoxicity occurred within 12 hours of treatment and no further fungitoxicity occurred between 12 and 24 hours.

No differences were obtained between the 3 different methods of application used against V. albo-atrum microsclerotia in sealed containers, although with P. cinnamomi, soil drenches were much less effective than injections. 25°C was the most favourable temperature for the fungitoxic action of DMTT against both species, and this temperature appeared to be the optimum for toxicity. SMDC was most toxic to V. albo-atrum at 20°C and with the soil moisture at 50 and 100% of field capacity; however, when the soil moisture was increased to 200% of field capacity, the greatest fungitoxic action occurred at 25°C. SMDC was most active against P. cinnamomi at 25°C, only slightly less active at 20°C, but much less so at 15°C.

A soil moisture level of 50% of field capacity was most favourable for toxic action of DMTT and SMDC against V. albo-atrum, while maximum fungitoxicity of both compounds to P. cinnamomi occurred in soil adjusted to field capacity.

DMTT and SMDC decompose to produce a vapour toxic to the mycelium of P. cinnamomi. Two decomposition products of DMTT, methylamine (1) and methylisothiocyanate (2) were tested against V. albo-atrum, (2), at low concentrations, was toxic to V. albo-

atrum but (1), at the same concentrations, was not. When (2) was compared in sealed and open containers, much greater activity against V. albo-atrum was obtained in the sealed containers. The slope and LD 50 obtained in the sealed containers compared quite closely with those obtained for DMTT and SMDC, supporting the hypothesis that (2) is probably the active substance. - Diss.Abstr., 21,(3),418.

152. HUFFMAN, C.W. and ALLEN, S.E. (Idon Oil Co., El Dorado, Arkansas,U.S.A.) Molecular size vs. herbicidal activity of anilides. J.Agric.fd Chem., 1960, 8,(4), 298-302, tabs.5,bibl.20.
A number of the most effective herbicides were found to have 2 common dimensions. Anilides were powerful foliage toxicants and the most active anilides possessed the 2 desired dimensions. Substitution of the phenyl ring also markedly affected phytotoxicity. Maximum toxicity of anilides was associated with 3,4-chlorination of the phenyl ring. A chlorine atom in the 2 position greatly inhibited activity. Thioanilides were as active as anilides. - From Authors' Summary. - J.W.F. [O.W.]

153. GARDNER, K. and OVERTON, K.C. (Fisons Pest Control Ltd.,Cambridge, England). Analysis of MCPA/TBA herbicide formulations. 2. A gas-liquid chromatographic method for the determination of 4-chloro-2-methyl phenoxyacetic acid. Anal.Chim.Acta., 1960, 23,337-45.
In the method proposed, the required acid is separated from associated phenoxyacetic acids, chlorocresols and chlorobenzoic acids by conversion to the methyl ester by the methanol-H_2SO_4 method. The ester was then chromatographed on a vacuum grease column at 190°F and measured by a standard addition of ethyl benzoate. - P.J.B. [431(42)]

154. JOHNSTON, I. (Levington Res.Sta., Ipswich,Suffolk,England). Determination of trichloroacetate when incorporated in an N.P.K. fertiliser. J.Sci.Fd Agric., 1960, 11,(12),695-700.
A partition chromatographic method for the determination of amounts of about 0.5% trichloroacetate in NPK fertiliser is described. Free trichloroacetic acid, together with its main contaminant, dichloroacetic acid, is extracted from the fertiliser, chromatographed and the individual acids titrated with sodium methoxide. The method will also separate acetic mono-, di- and trichloroacetic acids in the presence of each other. A recovery of 97% ± 2% is indicated for the method. - P.J.B. [O.W.]

155. YOUNG, H.Y. (Pineapple Res.Inst., Honolulu,Hawaii). Colorimetric microdetermination of 1-chloro-2-nitrobenzene in pineapple. J.Agric.fd Chem., 1960, 8,(3), 213-4, figs.1,tabs.4,bibl.3.
1-chloro-2-nitrobenzene is extracted from pineapple tissue and determined colorimetrically by measuring the intensity of the azo dye formed after reduction, diazotization, and coupling with N-(1-naphthyl)-ethylenediamine. This micromethod can determine 0.01 p.p.m. of the herbicide in pineapple. - Author's Summary. [O.W.]

156. AUDUS, L.J. (Bedford Coll.,Univ.London, England). Microbiological breakdown of herbicides in soils. Symp.Herbicides and the Soil. Oxford, Blackwell's Sci.Publns, 1960, 1-19, figs.4,tabs.5,bibl.45.
Aspects discussed include the kinetics of the breakdown of phenoxyacetic acids by soil microorganisms, the mechanism and persistence of the build-up of populations of microorganisms able to degrade herbicides, the relation between the molecular structure of herbicides and the ease with which they are degraded, and the results of cross-perfusion experiments to study biochemical pathways of herbicidal breakdown. - P.J.B. [O.W.]

157. van der ZWEEP, W. (Inst.voor Biol.en Scheik.Onderz.,Wageningen,Netherlands). The persistence of some important herbicides in the soil. Symp.Herbicides and the Soil, Oxford, Blackwell's Sci.Publns, 1960, 79-88, bibl.19.
Aspects discussed include the fate of herbicides in the soil and the persistence of herbicides applied as pre-sowing, pre-em. and post-em. treatments. Practical measures for improving the efficiency of herbicides applied to the soil are also considered briefly. - P.J.B. [O.W.]

158. HARTLEY, G.S. (Fisons Pest Control Ltd., Chesterford Park Res.Sta.,Saffron Walden, Essex,England). Physico-chemical aspects of the availability of herbicides in soils. Symp.Herbicides and the Soil, Oxford, Blackwell's Sci.Publns, 1960, 63-78, figs.3,bibl.19.
The following aspects of the physical

behaviour of herbicides in the soil are discussed: diffusion, flow, solubility, intermittent evaporation from the soil surface, adsorption, and the effect of soil moisture level at the time of applying herbicides. - P.J.B. [O.W.]

159. FLETCHER, W.W. (West of Scotland Agric.Coll.,Glasgow,Scotland). The effect of herbicides on soil micro-organisms. Symp.Herbicides and the Soil. Oxford, Blackwell's Sci.Publns, 1960, 20-62, bibl. 255.

The effect on populations of bacteria, actinomycetes and fungi in the soil and in vitro of the following herbicides and other substances is reviewed: ammonium sulphamate, calcium cyanamide, sodium arsenite, borax, sodium chlorate, sulphuric acid, IAA, NAA, 2,4-D, 2,4,5-T, MCPA, 2,4-DB, 2,4,5-TP, MCPB, 2,4-DES, NPA, TCA, dalapon, propham, chlorpropham, CDEC, CDAA, CDEA, DCU, monuron, DNOC, dinoseb, PCP, amitrole, endothal, MH and surface-active agents and emulsifiers. - P.J.B. [O.W.]

160. AELBERS, E. and HOMBURG, K. De inactivering en penetratie van simazin in de grond. [The inactivation and penetration of simazine in the soil.] Meded.LandbHogesch.Gent, 1959, 24,(3/4),893-8. (Du.e.), figs.2,tabs.4,bibl.3.

Estimates by a biological assay after applying 2.5 and 5 kg/ha showed that in all soil types analysed, most of the simazine was inactivated within 3 months of application. Residues 11 months after applying 5 kg/ha were less than 5%. When detected at soil depths greater than 15 cm the quantities were less than 0.1 p.p.m. Penetration into the 10-15 cm soil layer was less the higher the amount of clay or humus in the soil. Simazine was inactivated more rapidly by the humus than by the clay fraction. - D.M.L.S. [C.A.]

161. DEWEY, O.R. (Fisons Pest Control Ltd., Chesterford Park Res.Sta.,Saffron Walden, Essex,England). Further experimental evidence on the fate of simazine in the soil. Proc.5th Brit.Weed Control Conf.1960, pp.7, tabs.4,bibl.10.

Information on the behaviour of simazine in the soil is briefly reviewed and the results of work carried out by the author are included. In tests of the effect of soil type on simazine, in terms of a given plant response, 3 oz simazine/ac was needed on an acid sand with no clay and 10% humus, 5 oz on a clay soil with 50% clay, 5% humus and 16 oz on a fen soil with 5% clay, 60% humus. In infiltration studies 4 months after application of 10 # were made to a heavy clay soil in the wet season of 1958 (16 in. rain between May and September) 70% was at the 0-2 in. depth, 18% at 2-4 in., 5% at 4-6 in., 4% at 6-8 in., 2% at 8-10 in., and 1% at 10-12 in. Potatoes grown in the following season showed no toxicity. In a trial in 1959 in which simazine at 1 and 2 # was applied to barley on a chalky fen soil, no residue from the 1 # rate was found 4 months later and 7% was recovered from the 2 # rate, of which 68% was in the top 2 in. of soil. Where soil was sprayed with simazine at 32 # and exposed, dry, to a 700 w mercury vapour U/V lamp at a distance of 20 in. away for 14 days, the toxicity after this period was equivalent to that where 4 # had been applied, without ultra-violet treatment. Data are given of the losses of simazine in sterilized and non-sterilized fen peat soils. The absorption and breakdown of simazine by resistant weeds as a factor in removing simazine from soils is noted. - P.J.B. [O.W.]

162. DEWEY, O.R. and PFEIFFER, R.H. (Fisons Pest Control Ltd.,Chesterford Park Res.Sta.,Saffron Walden,Essex,England). Soil persistence and biological breakdown of 2,3,6-trichlorobenzoic acid. Paper 11th Internat.Symp.Crop Prot.,Gent, 1959, pp.8; Meded.LandbHogesch.Gent, 1959, 24,(3/4), 899-904, figs.2,tabs.4,bibl.6.

Biological tests with field soil samples 5 months after spraying with 0.16-10 kg/ha were interpreted as follows:- (1) Where rates below 2.5 kg/ha had been applied, no residual activity could be detected in the top 30 cm of soil. (2) In the dosage range 3.5-10 kg/ha the maximum dosage found in any 5 cm layer was only 2% of total applied, and in the total 30 cm of soil only 7% was found. (3) At the highest rates, little 2,3,6-TBA remained in the top 5 cm of soil. The total % of 2,3,6-TBA recovered increased with the depth of soil sample down to 30 cm. (During the 5 months between application and assessment rainfall was 350 mm).

Results from 2 laboratory experiments showed a marked reduction in residue activity when treated soil samples were kept under conditions favourable for micro-organisms. Soil samples kept frozen or steam sterilized before the experiment showed high residual

activity. 380 g/ha (as recommended for selective weed control in cereals) left no residual activity 2 months after application to a rich organic soil which was kept in polyethylene bags at 20°C. In open pans a trace of activity on Phaseolus vulgaris could be detected. The same rate on the frozen and sterilized sample produced marked activity. There was significantly less breakdown in sandy than in rich organic soil, but at lower rates breakdown was still considerable in the sandy soil. Keeping soil moist increased breakdown. In soil which was left open but kept moist by the addition of distilled water considerable toxicity disappeared but toxicity remaining was higher than parallel samples kept in polyethylene bags. - D.M.L.S. [435(42)]

163. SANDFORD, H. and STOVELL, F.R. (Shell Chem.Co.Ltd.,London,England). Residual phytotoxicity of amitrol and dalapon to barley and kale. Proc.5th Brit.Weed Control Conf.1960, pp.4, tabs.4,bibl.2.

Three trials were carried out in the very dry season of 1959 on light, medium and heavy soils, respectively, on areas of cereal stubble lying fallow. Activated amitrole (amitrole + NH_4SCN) 3, 4 and 6 # and dalapon 7.4 and 11.1 # were applied in 30 gal spray in March, May and August. The residual toxicity of dalapon to barley and kale was greater than that of amitrole; these crops sown 5 weeks after dalapon treatment showed slight damage in the case of kale and severe damage in barley, while amitrole similarly applied caused no injury. After spraying, plots were cultivated either by a plough or by a rotary cultivator at intervals of 1, 2 or 3 weeks. Rotary cultivations were more effective than ploughing in accelerating the breakdown of amitrole; with dalapon, the reverse occurred, though the reasons for the latter were not clear. - P.J.B. [O.W.]

164. MURPHY, R.T. and BARTHEL, W.F. (Plant Pest Control Div.,U.S.Dep.Agric., Gulfport,Miss.,U.S.A. Determination of heptachlor and heptachlor epoxide in soil. J.Agric.fd Chem., 1960, 8,(6),442-5, figs.3,tabs.2,bibl.10.

A method is described in which it is possible to determine amounts of 0.01 p.p.m. heptachlor and heptachlor epoxide in soil with satisfactory accuracy. Loss of heptachlor from plots treated with rates of 0.25-1 # was initially rapid, but was followed by a much slower rate of loss, accompanied by the conversion of a portion of the heptachlor to heptachlor epoxide. - P.J.B. [O.W.]

165. BARTHEL, W.F., MURPHY, R.T., MITCHELL, W.G. and CORLEY, C. (Plant Pest Control Div., U.S.Dep.Agric.,Gulfport,Miss.,U.S.A.) The fate of heptachlor in the soil following granular application to the surface. J.Agric. fd Chem., 1960, 8, (6),445-7, figs.1,tabs.5, bibl.7.

Heptachlor was applied to soil at a nominal rate of 2 # (20 # of a 10% formulation in U.S. Government specification granules). After 1 week 24% of the heptachlor remained and 14% after 1 month, after which period the amount remained relatively constant. 10-g samples of 10% heptachlor granules were exposed to the air (but not to sunshine) in temperatures of 70-100°F. After 14 days, slightly more than 50% of the heptachlor remained and about 25% after 28 days. The loss was due to volatilization, which began as soon as the oil solvent evaporated. Where amounts of 5, 10 or 20% solvent were used in formulations of granules with Attapulgus clay, the amount of solvent had little effect on heptachlor losses from the soil. The use of vegetable and animal oils (maize, groundnut and neat's foot oils and tallow) reduced heptachlor losses slightly compared with mineral oils. In further trials, Aroclor (a chlorinated biphenyl), rosin and a heavy aromatic naphtha were used. At 3 months after applying granules formulated with these materials to soil, 29 and 22% of the heptachlor remained where Aroclor and rosin were used, but only 10% where naphtha was used. Data are also given of the heptachlor and heptachlor epoxide remaining in soil after 6 months where different oils were used to formulate granules. Soil factors favouring the volatilization of heptachlor (small granule size, poor ground cover of vegetation) were associated with the disappearance of heptachlor, but the conversion of heptachlor to heptachlor epoxide (a maximum of 26% of the applied heptachlor in these trials) was also a significant factor. - P.J.B. [O.W.]

166. KURTH, H. (Landwirtschaftliche Versuchsstation Bösien, Krs.Merseburg, E. Germany). A method for detecting chlorinated aliphatic acid herbicidal residues in the soil by the use of Bromus secalinus. Proc.5th Brit.Weed Control Conf.1960, pp.4, tabs.1,bibl.5.

The bioassay method described uses the variety Altmark of Bromus secalinus because of its rapid and consistent germination, balanced growth and sensitivity to chlorinated aliphatic acids, including dalapon, TCA and trichloropropionic acid. Samples of the soil to be tested for residues of these herbicides are taken from the 0-5, 5-10, 10-15 and 15-20 cm layers, dried, sifted, placed in Petri dishes and 100 seeds of B. secalinus sown. The dishes are then placed in a temperature of 15-20°C for 3 weeks and the growth compared with that of controls as a measure of the residual herbicidal activity. The results are given of residue trials with a loess loam soil with a high organic matter content. Dalapon was inactivated first, followed by TCA and trichloropropionic acid. - P.J.B. [O.W.]

167. MOUNAT, A. and HITIER, H. Essais de desinfection chimique des sols pour semis de tabac. [Trials on the chemical disinfection of tobacco seedbeds.] Ann. Inst. exp. Tabac Bergerac, 1959, 3, 287-98, (F.e.)
In a trial with Paraguay P.48 and White Burley in 1959, SMDC and allyl alcohol were applied at 100 and 200 ml/5 l water and methyl bromide (MeBr) at 50 g/m^2, 10 and 20 days before early, normal and late sowing. At 200 ml, SMDC was effective both as a herbicide and a fungicide but it delayed germination in 2 out of 3 cases when applied only 10 days before sowing. Allyl alcohol was slightly superior to SMDC as a herbicide at both rates but was not a good fungicide; it could be safely applied at a slightly shorter interval before sowing than SMDC. MeBr was effective both as a herbicide and a fungicide but was less convenient to apply. None of the 3 was better or more economical than steam sterilization. - Hort. Abstr., 30, 5658.

APPLICATION AND MACHINERY

168. FUCHS, N.A. Evaporation and droplet growth in gaseous media. [Translated from the Russian.] The Pergamon Press, Oxford, 1959, pp.72.
The kinetics of the evaporation and growth of droplets of pure liquids is surveyed. - P.J.B. [N.I.A.E.]

169. LEASURE, J.K. (Agric. Res. Cent., Dow Chem. Co., Midland, Michigan, U.S.A.) The effects of added penetrant aids and wetting agents on the response of quackgrass (Agropyron repens (L.) Beauv.) to dalapon. Proc. 5th Brit. Weed Control Conf. 1960, pp.7, tabs.4, bibl.12.
The non-ionic wetting agents Tergitol TMN and Polyglycol 26-2 were added to dalapon to give concentrations of 0.2, 0.1 and 0.05% by weight, which was then applied at a rate equivalent to 10 lb dalapon-sodium in 60 U.S. gal to the 3rd leaf of Agropyron repens plants at the 6-leaf stage. The A. repens plants were grown from rhizome sections with 2 nodes and the second shoot was at the 3-leaf stage at the time the first shoot was treated at the 6-leaf stage. The dalapon was applied as 0.5 ml of solution to an area 5 x 50 mm which was walled by lanoline and allowed to dry. After 5 days the % of applied dalapon in the new rhizome, old rhizome, untreated shoot and roots for dalapon alone was 0.74, 0.22, 4.9 and 0.26, for dalapon + Polyglycol 26-2 at 0.2%, 2.94, 0.81, 10.5 and 0.24 and for dalapon + Tergitol TMN at 0.2%, 3.65, 0.94, 9.4 and 0.31, respectively. The results indicated that the addition of non-ionic wetting agents resulted in increased movement of dalapon into the rhizomes and accumulation of dalapon in young tissues. - P.J.B. [O.W.]

170. WARREN, G.F. (Purdue Univ., Lafayette, Indiana, U.S.A.) Recent developments in granular herbicides in the United States. Proc. 5th Brit. Weed Control Conf. 1960, pp.5, bibl.11.
The advantages and disadvantages claimed for granular herbicides are reviewed. Weed control with granular materials is often less effective than with sprays. The possible reasons for this and ways of correcting this are discussed briefly. - P.J.B. [O.W.]

171. YATES, W.E. (Univ. Calif., Davis, Calif., U.S.A.) Minimising spray drift hazards. Down to Earth, 1960, 16, (2), 15-19, figs.7, tabs.1, bibl.6.
A unit was designed for securing maximum drift control, using 2,4-D applications for control of Ipomoea spp. in grape vines. It consisted of a semi-circular boom-shield, with flexible neoprene curtains, nozzles 8 in. apart and 8 in. above ground. Weed control was good and spray drift was slight.

Grape quality was not affected and yields were much increased. Drift potential was much decreased using large-orifice nozzles with a narrow fan angle and flat fan-nozzles at 3.5 p.s.i., using sprays of high surface tension, high density and high viscosity. - P.C. [O.W.]

172. TAPSCOTT, A.R. and MAPOTHER, H.R. (Long Ashton Res.Sta.,Bristol,England). Spray application problems: LXII. The limits of visibility of fluorescent tracers in spray liquids. Rep.Long Ashton Agric. Res.Sta., 1959, 103-5. tabs.3.
It was shown that in droplets of 20-30 microns diameter tracer will be found associated with active spray material. In all formulations,using tracers at or below normal field concentrations, droplets of 50-80 microns diameter are visible by eye, and droplets of 20-30 microns diameter can be seen by microscope. When Saturn Yellow is used as a suspension, the tracer is apparent even though, theoretically, there is not sufficient tracer present to afford a distribution of 1 tracer particle/droplet. Using Saturn Yellow (particle size 4 microns) at 0.01% the ratio of particles of tracer to droplets is as follows: 20 microns = 1:57; 25 microns = 1:21; 30 microns = 1:17. In order to obtain 1 particle per droplet at 30 microns diameter it would be necessary, in theory, to raise the concentration of tracer to 0.17%. - D.M.L.S. [O.RE.]

173. PFEIFFER, R.K. (Chesterford Park Res.Sta.,Saffron Walden,Essex,England). Variable dosage experimental spraying. Proc.4th Internat.Congr.Crop Prot., Hamburg 1957, 1959, I, 471-3, figs.4, tabs.1,bibl.6.
A brief discussion of the type and scientific value of information given by logarithmic sprayers. - D.M.L.S. [436(42)]

174. FRYER, J.D., PARKER, C. and WOODFORD, E.K. (A.R.C.Weed Res.Org. Begbroke Hill Farm,Oxford,England). The spray-incorporating drill. A machine designed to improve the reliability of soil-acting herbicides. Proc.5th Brit. Weed Control Conf.1960, pp.5, tabs.1.
The principles of the spray-incorporating drill are discussed. The equipment, in its present experimental stage, is designed to apply herbicide, then incorporate it by means of 9 in. wide rotary cultivator (298 r.p.m., 4.6 cuts/ft at 1.5 m.p.h.), then consolidate the loose soil with a roller to give a standard seedbed, and finally to sow seed with a precision drill. It is semi-mounted, with castor wheels at the rear and is coupled conventionally to the tractor linkage. The herbicide is applied with an Oxford Precision Sprayer mounted on the machine, or by an operator walking alongside. In trials during 1958-59 on a light loam soil, no adverse effects of cultivation immediately prior to sowing on emergence or subsequent crop growth were noted, except in one case with sugar beet in which moisture conditions were already marginal for germination. There was an unexpectedly low incidence of serious crop damage caused by the incorporated herbicides even though the crop roots were in contact with the herbicide for long periods in some cases. The following were the tentative upper limits of rate of application (lb) of soil-incorporated herbicides for different crops used in these trials: (a) maize, simazine 2, atrazine 2, 2,4-D ester 1.5; (b) carrots, propazine 1; (c) sugar beet, CDEC 3, TCA 4 endothal 4.5 + propham 3.5, 2,3-dichloro-allyl diisopropylthiolcarbamate 3; (d) red beet, endothal 6 + propham 4.5; (e) mangels endothal 4 + propham 3; (f) kale, EPTC 2, CDEC 8, CDAA 8; (g) turnips, CDEC 8, CDAA 8; (h) swedes CDEC 8, CDAA 8. The degree of weed control appeared to be little affected by incorporating the herbicides instead of being applied to the soil surface. EPTC gave better results with incorporation and propazine was more effective against Matricaria chamomilla. Under some conditions, such as a stale seedbed, rotary cultivation by itself gave almost complete weed control. The need for studies to determine the precise depth and extent of incorporation of soils by rotary cultivation is stressed. - P.J.B. [O.W.]

175. CHALMERS, G.R. and KEMP, D.C. (Nat.Inst.Agric.Engng.,Wrest Park,Silsoe, Beds,England). Plot drill with sprayer equipment for experiments on pre-emergence control of weeds by herbicides. J.agric. engng Res., 1960, 5,(4),443-4, figs.1.
The machine described is intended to drill two 20 in. experimental rows, with a guard row each side. It is semi-mounted with castor wheels at the rear and is coupled conventionally to the tractor draught links with standard stabilizer bars. There are two 9 in. wide rotary cultivators working at depths up to 4 in. and arrangements are

made for rapid control of cultivation depths where constantly varying depths are required. The herbicide is applied from an Oxford Precision Sprayer mounted on the machine. It is controlled by an operator walking alongside and the nozzles are so positioned that a spray band can be applied either in front of each rotary cultivator, or behind each drill. - P.J.B. [O.W.]

176. BAGNALL, B.H., CALDICOTT, J.J.B. and HINTER, D.J. A technique for the aplication of pre-emergence herbicide on sugar beet. Proc.5th Brit.Weed Control Conf.1960, pp.4, bibl.3.
In 21 trials designed to investigate the possibility of completely mechanizing the spring programme of sugar beet cultivation, a prototype machine was developed, consisting of a P.T.O.-operated 5-row precision drill, together with a 60 gal spray tank mounted on the 3-point linkage of a tractor. Low-pressure, no-drift nozzles were used to give a spray band 7 in. wide over the row, with a spray output of 21 gal/ac on an overall basis (7 gal actual). Disodium endothal + propham in a ratio of 4:3 a.e. was used at rates of 2 + 1.5 or 4 + 3 depending on soil type. Weed-free conditions were secured for 3-6 weeks after drilling. This technique was envisaged as suitable for combination with mechanical thinning and the use of triploid monogerm seed. The extent to which complete mechanisation was achieved is not mentioned. P.J.B. [O.W.]

177. McWHORTER, C.G. and WOOTEN, O.B. (Mississippi Agric.Exp.Sta. College Sta., Miss.,U.S.A.) Subsurface spraying improves punch of volatile herbicides. Crops & Soils, 1960, 13,(3),26, figs.1.
A new system for applying volatile herbicides below the soil surface is briefly described. In an experimental machine, a thin band of herbicide is sprayed from the open end of horizontal V blades 16 in. wide, running at depths of 2 to 6 in. below the soil surface. In tests in Mississippi, EPTC applied below the surface of a seedbed prepared for cotton gave 90% control of weeds, compared with 74% control where it was applied to the soil surface and incorporated with a rotary hoe. - P.J.B. [O.W.]

178. UNITED STATES, FLORIDA GROWER AND RANCHER. Underground spraying - kills weeds better. Fla Grower & Rancher, 1960, 13, figs.3. (44[76.2])

179. NETHERLANDS, STICHTING ARBEIDSZORG. De propaanrugspuit Type van der Weij voor slootbehandeling en landbouwgebruik. [The propane knapsack sprayer Type van der Weij for weed control in ditches and for agricultural use.] Publ.Stichting Arbeidszorg, Ede,Netherlands, (n.d.), pp.4, figs.1.
The apparatus described has a spray tank capacity of 15-16 l and is actuated by propane contained in a bottle with a capacity of 1.9 kg, sufficient to apply 200 l spray at a pressure of 3.5 atm. (50 lb p.s.i.). Spray booms are of bamboo, with a working width of up to 3 m. - P.J.B. [204(492)]

180. McKINLAY, K.S., MESMER, E.T. and LEE, C.W. (Colon.Pest.Res.Unit,Arusha, Tanganyika). A comparison of two tractor mounted airblast sprayers for applying low volume sprays to multiple stem coffee. Misc.Rep.Colon.Pest.Res.Unit,Arusha, Tanganyika, (n.d.), 274, pp.13.
A comparison of deposits from the Micron Twin (made by Micron Sprayers Ltd., 56 Battersea High St.,London, S.W.11) and the Chiron (made by the Chiron-Werke,Tuttlingen/ Wurtt,Germany) suggested that the Chiron gave rather better results, but alternative settings might have considerably altered their respective performances. Both machines seemed to have an inherent limitation due to the small number of outlets and their being grouped close together near ground level. Coverage with height might be improved and the outlet settings be less critical if the outlets were separated and arranged up a vertical boom. - From Authors' Summary (modified). - D.M.L.S. [7(678)]

PHYSIOLOGY, MORPHOLOGY AND ANATOMY

181. JUNIPER, B.E. (Dep.Bot.,Univ.Oxford, England). The effect of pre-emergent treatment of peas with trichloroacetic acid on the sub-microscopic structure of the leaf surface. New Phytol., 1959, 58,(1), 1-4, figs.7, tabs.1,bibl.5.
Peas were sown in sand which was treated with different concentrations of TCA. The behaviour of water droplets on the leaves was observed, and it was found that the angle made by the droplet on the surface fell with increasing concentration of TCA. No changes in leaf structure which could account for these changes in behaviour were revealed by ordinary light microscopy.

Investigation of the sub-microscopic anatomy of the surface by the carbon replica technique, however, showed significant differences in the leaf surfaces. A reduction in the number, and a change in the form, of the minute wax structures takes place as the concentration of TCA in the soil increases. These changes correlate well with an increase in the wettability of the leaf surface, as determined by the contact angle of water droplets, and are consistent with the view that pre-emergent treatment with TCA makes the leaf more easily wettable by changing the development of wax structures on the cuticle and therefore increases the plant's susceptibility to damage by herbicides. - Mainly Author's Summary (modified). - D.M.L.S. [O.R.]

182. UNITED STATES, WEYERHAEUSER CO. Foliar absorption of herbicidal sprays. Extr.For.Res.Rep.Weyerhaeuser Co.,Centralia, Wash.1958, 1959, (6).

In experiments with excised alder leaves and radioactive 2,4,5-T and KH_2PO_4, the absorption ratio (concentration in the leaf in relation to that in the suspending solution) was highest at pH 30 and very low at pH 3.0. The toxicity of an oil solution had little effect on absorption during the 5 hours of the test. Absorption of both substances was better from an oil/water emulsion + emulsifier than from water + emulsifier alone. - For.Abstr., 21,4543.

183. PALLAS, J.E. (Dep.Bot.,Univ.Calif., Davis,California,U.S.A.) Effects of temperature and humidity on foliar absorption and translocation of 2,4-dichlorophenoxyacetic acid and benzoic acid. Plant Physiol., 1960, 35,(5),575-80, figs.6, tabs.3,bibl.26.

^{14}C labelled 2,4-D triethanolamine or triethanolamine benzoate was applied as drops to one unifoliate leaf of Red Kidney bean plants. Radioactivity in the epicotyl was counted, and radioautographs obtained of other plants. Extraction, solvent partition and chromatography showed that the bulk of the radioactivity was translocated as 2,4-D or benzoic acid. Absorption and translocation of both compounds increased with rising temperature and high humidity. These increases were correlated with a greater degree of stomatal opening. The radioautographs showed movement of 2,4-D out of the leaf largely confined to the vascular bundles and following the route of the assimilate stream. - K. Holly. [O.W.]

184. MITCHELL, J.W., SMALE, B.C. and METCALF, R.L. Absorption and translocation of regulators and compounds used to control plant diseases and insects. Adv. in Pest Control Res., 1960, 3,359-436, figs.2, tabs.5,bibl.250.

The following aspects of the absorption and translocation of growth-regulator herbicides are reviewed: the anatomy of seeds and of the leaves, stems and roots of plants; the use of different carriers, co-solvents and surface-active substances; movement through cuticle, cell walls, into and through protoplasm, through the vascular system and through phloem and xylem; movement into seeds. - P.J.B. [O.W.]

185. SAGAR, G.R. (Dep.Agric.Bot.,Univ.Coll. N.Wales,Bangor,N.Wales). An important factor affecting the movement of 2,2-dichloropropionic acid in experimental systems of Agropyron repens (L.) Beauv. Proc.5th Brit.Weed Control Conf.1960, pp.5.

In 2 experiments, ^{14}C-labelled dalapon was placed on the lamina of the youngest unrolled leaf of one shoot of A. repens grown from rhizome segments each bearing 2 nodes. A study was then made of the movement of the dalapon into the adjacent untreated shoot, as influenced by shading one or both shoots, or neither, or enclosing one or both shoots under transparent plastic envelopes. Dalapon did not move from treated to untreated shoots unless they were shaded. It moved from shaded into unshaded shoots, but not from unshaded into shaded shoots. It moved from shoots covered by a transparent shade into those not so covered and where both shoots were covered movement within the entire plant was extensive. It is suggested that opaque or transparent shading both reduce the rate of water in the xylem by increasing the humidity and that the movement of dalapon downward depends not only on the forces taking it down, but also on the rate of transfer from phloem to xylem. It is considered that humidity at the time of spraying may have a determining influence on the effectiveness of dalapon in the field. The problems involved in extrapolating from results obtained by using autoradiographic techniques are discussed. - P.J.B. [O.W.]

186. MEES, G.C. (I.C.I.Ltd.,Jealott's Hill Res.Sta.,Bracknell,Berks,England). Experiments on the herbicidal action of 1,1'-ethylene-2.2'-

dipyridylium dibromide. Ann.appl.Biol., 1960, 48,(3),601-12, figs.6,bibl.10.
Light was shown to increase the rate of kill obtained with diquat, without being essential for herbicidal action. The light effect, which was observed only in green tissues, increased with intensity up to about 10 k-lux, and was inhibited by monuron or the absence of oxygen, but not by potassium cyanide or in a carbon dioxide-free atmosphere. Diquat was also shown to stimulate and inhibit respiration. The stimulation was transitory and appeared to depend on a continuous supply to the tissues, while the inhibition did not.
It is concluded that the reduction of the herbicide to its free radical form is an essential step in the sequence of toxic reactions. Energy for reduction is presumed to come from the photolysis of water in the light, and from respiration in the dark. Once formed, the radical may initiate chain reactions in the presence of oxygen which end in the degradation of essential cytoplasmic components. - Author's Summary (modified).- D.M.L.S. [O.W.]

187. AARONSON, S. (Haskins Labs, 305 East 43rd St.,New York 17,New York State,U.S.A.) Mode of action of 3-amino-1,2,4-triazole on photosynthetic microorganisms. J. Protozool., 1960, 7,(3),209-94.
Two species of bacteria and 4 of phytoflagellates were used as test organisms to study the possible modes of action of amitrole on photosynthetic mechanisms. The compound inhibited the catalase activity of Ochromonas malhamensis and of beef liver. Lecithin, Fe^{++} and Fe^{+++} annulled the inhibition of multiplication and pigment synthesis caused by amitrole in O. danica. It is suggested that amitrole acts by interfering with the normal utilization of iron in the synthesis of iron-containing enzymes and mechanisms and that it does so by chelating iron. - P.J.B. [124(74.7)]

188. AARONSON, S. and SCHER, S. (Haskins Labs.,305 East 43rd St.,New York 17, New York State,U.S.A.) Effect of aminotriazole and streptomycin on multiplication and pigment production of photosynthetic microorganisms. J. Protozool., 1960, 7,(2), 156-8, tabs.4,bibl.12.
The studies reported were carried out using 3 alga species, a photosynthetic bacterium and Spirodela oligorhiza. Amitrole caused transient bleaching in all the test organisms; it also effectively inhibited their multiplication and did so to a similar extent in organisms grown in the dark and in the light. It was concluded that porphyrin synthesis may be the site of action of amitrole. - P.J.B. [128(74.7)]

189. SUND, K.A., PUTALA, E.C. and LITTLE, H.N. (Univ.Massachusetts,Amherst, U.S.A.) Reduction of 3-amino-1,2,4-triazole phytotoxicity in tomato plants. J.Agric. Fd Chem., 1960, 8,(3),210-2, figs.1,tabs.2, bibl.19.
The phytotoxicity of amitrole was studied, using tomato plants to determine the efficacy of selected compounds in reducing growth and chlorophyll toxicities. When the concentration of amitrole was 1×10^{-4}M, equimolar solutions of certain purine precursors simultaneously applied caused a reduction of amitrole growth inhibition; but this did not occur when all concentrations were 5 times this amount. Adenine, hypoxanthine, and guanine and their ribosides acted like the purine precursors. Riboflavin, FMN and FAD reduced not only amitrole growth inhibition at 5×10^{-4}M, but also the inhibition of chlorophyll formation. A hypothesis of the mechanism of amitrole phytotoxicity is presented, in which it is postulated that the essential action of amitrole is to disrupt the metabolism of purines and riboflavin and their derivatives. - Authors' Summary. [O.W.]

190. van DORST, H.J.M. and ter LAAK, P.J. Een veelbelovende groeistoff voor tomaten. [A promising growth regulator for tomatoes.] Jaarversl.Proefst.Groent.-en Fruittelt Onder Glas,Naaldwijk, 1958, (n.d.), 91-2.
A note is given on experiences with N-meta tolylphthalamino acid as a fruit-setter for tomatoes. It is compared with 2,4-D, MCPA and beta naphthoxyacetic acid. - P.J.B. [M.H.]

191. WILLIAMS, C.N. (Bot.Dep.,Univ.Coll., Ibadan,Nigeria). Growth movements of the radicle of Striga. Nature, Lond., 1960, 188,(4755),1043-4, figs.2,bibl.7.
Curvatures in the growth of radicles of Striga asiatica in vitro were shown to be associated with an inhibition of cell extension on one side of the radicle. Studies of the nature of the factor causing this inhibition indicated that it was similar to, but distinct from, IAA. - P.J.B. [O.W.]

192. WILLIAMS, C.N. (Univ.Coll.,Ibadan, Nigeria). Growth and morphogenesis of Striga seedlings. Nature,Lond., 1961, 189,(4762),378-81, bibl.15.
In experiments with seedlings of Striga asiatica grown from seed induced to germinate by exposure to elutes from Sorghum vulgare, both kinetin at 1 p.p.m. and light, especially red and, to a lesser extent, blue light, exercised strong morphogenic effects on the seedlings. These effects were typical of those induced in S. asiatica seedlings grown in the vicinity of a host plant and included root hair production, the stimulation of lateral expansion of the radicle and a reduction in extension growth. Kinetin at 10 and 100 p.p.m. and gibberellin both induced shoot development and branching of the radicle. It is considered possible that one component in the germination complex of S. asiatica may be a kinetin-like substance which both induces its seed to germinate and induces morphogenic changes in the seedlings. - P.J.B.
[O.W.]

PATENTS

193. FARBENFABRIKEN BAYER A.-G. 3-Furfurylideneamino-1,2,4-triazole. British Patent, 1957, 821 010.
Furfuraldehyde is condensed with 1 mol. of amitrole at 40-50°C in an inert solvent to give 3-furfurylideneamino-1,2,4-triazole, m.p. 189-190° (86% yield). The compound is especiallly useful as a cotton defoliant. - From Abstr.J.Sci.Fd Agric., 12, (1),i-25. - P.J.B.

194. GREAT BRITAIN. New triazine derivatives and herbicidal compositions containing them. British Patent, 1958, 819 520.
Compounds useful as herbicides comprise 2-chloro-s-triazines substituted in the 4- and 6-positions by $NH.[CH_2]_n.O.[CH_2]_m.H$ (m = 1.8; n=2.8; m + n = $\leqslant$4). A method of preparation is given. The synthesis of 2-chloro-4,6-di-(3-methoxypropylamino)-s-triazine, m.p. 159-163°, and its preparation as a herbicidal wettable powder is described. - J.Sci.Fd Agric., 11,(11), ii-211.

195. STEVENSON, H.A. and BROOKES, R.F. α-Phenoxyalkanoic acids. British Patent, 1956, 822 199.
Compounds useful as plant growth regulators and especially active against Galium aparine and Stellaria media. They comprise α-phenoxyalkanoic acids of the form R.O.CHR'.CO_2H (R is phenyl substituted by halogen and/or alkyl, R' is alkyl of $>$8 C. Details are given of the preparation by an improved method of α-(4-chloro-2-methylphenoxy) propionic acid, m.p. 81-84°C. in 89.2% yield and of α-(2,4-dichlorophenoxy) propionic acid, m.p. 114-116°C. - From J.Sci.Fd Agric., 12,(1),i-24. - P.J.B.

196. J.R. GEIGY, A.-G. Plant growth regulants comprising heterocyclic nitrogen compounds. British Patent, 1956, 822 069.
A composition for use as a herbicide comprises a (phytotoxic) carrier (b.p. $>$175°C if liquid) and at least one diazine and/or benzodiazine substituted by one or more halogen, mono- or dialkylamino, alkoxy, alkenyloxy, alkylthio, alkenylthio, polymethyleneimino, or morpholino radical, or optionally NH_2 or alkyl of $\not>$4 C. Thus, 2,6-di(ethylamino)-6-chloropyrimidine is ball-milled with kaolin (19.5) and adhesive provide a herbicidal dusting composition. - From J.Sci.Fd Agric., 12,(1),i-23. - P.J.B.

197. PYNE, W.J., ROSEN, I. and BLUESTONE,H. Polychlorotetrahydrothiophen-1-oxides. British Patent 1957, 822 115.
Compounds claimed comprise 2-chlorotetrahydrothiophen-1-monoxides and -1,1-diozides substituted by a further 1-7 Cl. - From J.Sci.Fd Agric., 12,(1),i-25. - P.J.B.

MISCELLANEOUS

198. HARPER, J.L. (Editor). (Dep.Agric. Bot.,Univ.Coll.N.Wales,Bangor,N.Wales). The biology of weeds. Symp.Brit.ecol.Soc., 1960, Blackwell's Sci.Publns, 42/-, pp.256.
Comprises the following papers (all of which are abstracted separately under the authors' names):- 1. The history of weeds in Britain, by H. Godwin. 2. Some reflections on the ecology of weeds, by A.H.Bunting. 3. Patterns of change within grassland

communities, by H. Lieth. 4. Some taxonomic problems in weedy species, by E.F. Warburg. 5. The taxonomy of the British knotgrasses, by B.T. Styles. 6. Some problems in Viola tricolor L. and its allies, by A. Pettet. 7. Race formation in weedy species with especial reference to Euphorbia cyparissias and Hypericum perforatum L., by T. Pritchard. 8. Dormancy in weed seeds, by J.M. Thurston. 9. Germination of the seeds of angiospermous parasites, by N. Sunderland. 10. Assessment and control of the dissemination of weeds, by crop seeds by P.S. Wellington. 11. The control and eradication of weeds in seed crops by S. Hitchings. 12. Factors controlling plant numbers, by J.L. Harper. 13. Studies on plant competition, by J.K.A. Bleasdale. 14. Studies on the mutual influences of weeds and crops, by P. Martin and B. Rademacher. 15. The influence exerted by species of Camelina on flax by means of toxic substances, by G. Grümmer and H. Beyer. 16. Toxin production from Agropyron repens, by P.J. Welbank. 17. Species of Acacia as weeds, by G.W. Ivens. 18. The ecology of some New Zealand woody weeds by E.C.S. Little. 19. The water hyacinth and the Sudan, by P.A. Gay. 20. The ecology and biology of parasitism of the Loranthaceae of Ceylon, by W.G. Weeraratna. 21. A comparative life-history study of Cirsium arvense (L.) Scop. and Tussilago farfara L., the most troublesome weeds in the newly reclaimed polders of the former Zuiderzee, by D. Bakker. 22. Adaptability in Allium vineale, by A. Lazenby. 23. Factors affecting the germination and early establishment of plantains (Plantago lanceolata, P. media and P. major) by G.R. Sagar and J.L. Harper. 24. Nardus stricta, a weed of hill grazings, by M.J. Chadwick. - D.M.L.S. [O.W.]

199. MATTHEWS, L.J. (N.Z. Dep. Agric., Wellington, New Zealand). Chemical methods of weed control. Bull. N.Z. Dep. Agric., 1960, 329, pp. 200.
This bulletin is a revised and much enlarged version of that published originally in 1956. It is divided into 5 main sections. Section 1 reviews the principles of weed control and the uses of herbicides. Section 2 describes the properties of all the major herbicides in use, summarises their uses and, in many cases, gives lists of weeds susceptible to them. Section 3 (pp. 83-156) gives detailed information on the control of the major weeds of New Zealand individually. Section 4 reviews weed control in field crops, pastures and other specific areas and Section 5 is devoted to a practical review of the application of herbicides. - P.J.B. [O.W.]

200. PETERSEN, H.I. Ukrudtsplanter og ukrudtsbekaempelse. [Weeds and weed control.] København: Landhusholdningsselskabets Forlag, 1960, pp. 144.
In an introductory section, weed control in different agricultural crops in Denmark is reviewed with, in a number of cases, data of yields with and without herbicidal treatment. The main section of the book is devoted to colour plates with explanatory notes, of 50 of the most serious weeds of agricultural crops in Denmark. Each species is illustrated at 3 growth stages from the seedling stage to the rosette stage and in the case of 24 species, at the fully grown stage, also. The illustrations are of outstandingly good quality. In the last section, different commercial herbicides on the market in Denmark are listed, with their active constituents. - P.J.B. [W2(489)]

201. WEST GERMANY, BAYER FARBENFABRIKEN, A.-G. Bayer Pflanzenschutz Compendium. [Bayer compendium of plant protection.] Farbenfabriken Bayer, A.G., Leverkusen, (n.d.), pp. 221.
This is a loose-leaf publication dealing primarily with the practical use of Bayer products for controlling pests, diseases and weeds in field, vegetable and fruit crops. There is an extensive section containing excellent coloured illustrations of pests and diseases of different crops and of nearly 40 weed species. - P.J.B. [W16(43)]

202. (THOMPSON, F.B.) (Rukuhia Soil Res. Sta., Hamilton, New Zealand). Thirteenth Weed Control Conference. N.Z.J. Agric., 1960, 101, (3), 225-8.
An account of the 13th New Zealand Weed Control Conference held in July 1960 in Invercargill. It includes a full list of papers read. (These will be abstracted in Weed Abstracts in due course). - D.M.L.S. [O.RE.]

203. SIMMONDS, F.J. (Commonw. Inst. Biol. Control, Ottawa, Canada). Biological control - past, present and future. J. Econ. Ent., 1959, 52, (6), 1099-1102, bibl. 12.
For insects, weeds and other pests. A discussion in general terms in which the author gives reasons for his belief in an expansion of biological control methods in the future. - D.M.L.S. [O.W.]

204. THOMPSON, P.A. (Scottish Hort.Res. Sta., Mylnefield, Invergowrie Dundee, Scotland). The use of maleic hydrazide for the control of runners in strawberry plantations. Proc.5th Brit.Weed Control Conf.1960, pp.7, bibl.12.
MH. Strawberry runner control. - P.J.B. [O.W.]

205. UNITED STATES DEPARTMENT OF AGRICULTURE. Revisions of entries currently included in "A summary of certain pesticide chemical uses". Mimeo.Publ.U.S.Dep.Agric., 1960, Ser.10, pp.5.
See Weed Abstr., 9,734. The revisions include:- (1) PCP in seed crops; add to limitations "Do not graze or feed hay or threshings to livestock". (2) Sodium arsenite in grapes; change dosage to 9 %. - D.M.L.S. [W28(73)]

206. GREAT BRITAIN, MINISTRY OF AGRICULTURE, FISHERIES AND FOOD. Agricultural Chemicals Approval Scheme. List of approved products 1961. Publ.Minist. Agric.Fish.Fd, 1961, pp.93. [R.30]

207. UNITED STATES DEPARTMENT OF AGRICULTURE. State noxious-weed seed requirements recognised in the administration of the Federal Seed Act. Misc.Publ.U.S.Dep. Agric.Mktg Serv., 1960, pp.122.
This is a list of the applicable provisions and recognised interpretations of State laws and regulations pertaining to noxious weed seeds and is intended as a guide to the administration of Title II of the Federal Seed Act in the U.S.A. - P.J.B. [O.W.]

208. GERBERG, E.J. (Insect Control Res. Inc., Baltimore, Maryland, U.S.A.) Pesticide registration laws of Central and South America. Agric.Chem.1960, 15,(11),47-50.
Pesticide registration laws in each of the central and S. American countries are reviewed briefly. - P.J.B. [O.W.]

209. SHAW, W.C. State and Federal personnel engaged in research and extension in the field of weed control, September 1960. Publ.U.S.Dep.Agric., ARS, Crops Res.Div., Beltsville, Md, 1960, pp.43. [108(75.2)]

210. HAYES, J.D. (Welsh Plant Breed.Sta., Aberystwyth, Wales). Investigations on the effect of DDT on barley. Rep.Welsh Plant Breed.Sta.1959, 1960, 76-80, tabs.3, bibl.7.
Varietal differences in reaction to DDT has been demonstrated in barley. Spraying of susceptible varieties caused severe chlorosis and the cessation of growth in treated leaves, though succeeding leaves which were not touched by the spray grew normally. Spraying at the early seedling stage in some cases caused wilting and death of the whole plant. Resistance to DDT was shown to be controlled by a single major gene, with susceptibility dominant over resistance. - P.J.B. [O.W.]

211. HAYES, J.D. (Welsh Plant Breed.Sta. Aberystwyth, Wales). Varietal resistance to spray damage in barley. Nature, Lond., 1959, 183 (4660),551-2. figs.1.tabs.2. [O.W.]

List of Common Names and Chemical Abbreviations

The following list, based on that adopted by the Weed Society of America, has been approved by the British Weed Control Council, except for those marked □.
An asterisk (*) signifies common names approved by the B.S.I.
A plus sign (+) signifies approval by the Weed Society of America.

amiben □+	3-amino-2,5-dichlorobenzoic acid
amitrole □+	3-amino-1,2,4-triazole
AMS □+	ammonium sulphamate
atrazine □+	2-chloro-4-isopropylamino-6-ethylamino-1,3,5-triazine
barban □	4-chloro-2-butynyl-N-(3-chlorophenyl)carbamate
CDAA +	2-chloro-NN-diallylacetamide
CDEA +	2-chloro-NN-diethylacetamide
CDEC +	2-chloroallyl-NN-diethyldithiocarbamate
chlorpropham *	isopropyl-N-(3-chlorophenyl)carbamate
4-CPA +	4-chlorophenoxyacetic acid
4-CPB	4-(4-chlorophenoxy)butyric acid
2,4-D +*	2,4-dichlorophenoxyacetic acid
3,4-DA +	3,4-dichlorophenoxyacetic acid
dalapon +*	2,2-dichloropropionic acid
2,4-DB *	4-(2,4-dichlorophenoxy)butyric acid
DCU □+	dichloralurea
2,4-DEB +	2,4-dichlorophenoxyethyl benzoate
2,4-DES *	2,4-dichlorophenoxyethyl hydrogen sulphate
dichlone +*	2,3-dichloro-1,4-naphthoquinone
dinosam *	2-s-amyl-4,6-dinitrophenol
dinoseb *	2-s-butyl-4,6-dinitrophenol
diquat +*	1,1'-ethylene-2,2'-dipyridylium dibromide
diuron +*	N-(3,4-dichlorophenyl)-N'N'-dimethylurea
DMTT □+	3,5-dimethyltetrahydro-1,3,5,2H-thiadiazine-2-thione
DNOC *	2-methyl-4,6-dinitrophenol or 3,5-dinitro-o-cresol
2,4-DP	2-(2,4-dichlorophenoxy)propionic acid
endothal +	3,6-endoxohexahydrophthalic acid
EPTC □+	ethyl-NN-dipropylthiolcarbamate
erbon +	2-(2,4,5-trichlorophenoxy)ethyl-2',2'-dichloropropionate
fenac □+	2,3,6-trichlorophenylacetic acid
fenuron +*	N-phenyl-N'N'-dimethylurea
ipazine □+	2-chloro-4-diethylamino-6-isopropylamino-1,3,5-triazine
MCPA +*	4-chloro-2-methylphenoxyacetic acid
MCPB *	4-(4-chloro-2-methylphenoxy)butyric acid
MCPES +	sodium 4-chloro-2-methylphenoxyethyl sulphate
mecoprop *	dl 2-(4-chloro-2-methylphenoxy)propionic acid
MH □+	maleic hydrazide
monuron +*	N-(4-chlorophenyl)-N'N'-dimethylurea
neburon +	N-(3,4-dichlorophenyl)-N'-butyl-N'-methylurea
NPA +	N-1-naphthylphthalamic acid
PCP +	pentachlorophenol
PMA +	phenylmercuric acetate
propazine □+	2-chloro-4,6-bis(isopropylamino)-1,3,5-triazine
propham *	isopropyl-N-phenylcarbamate
simazine +*	2-chloro-4,6-bis(ethylamino)-1,3,5-triazine
SMDC □+	sodium methyl dithiocarbamate
2,4,5-T +*	2,4,5-trichlorophenoxyacetic acid
2,4,5-TB	4-(2,4,5-trichlorophenoxy)butyric acid
2,3,6-TBA +	2,3,6-trichlorobenzoic acid
TCA +	trichloroacetic acid
2,4,5-TES +	sodium 2,4,5-trichlorophenoxyethyl sulphate
2,4,5-TP	2-(2,4,5-trichlorophenoxy)propionic acid
trietazine □+	2-chloro 4-diethylamino-6-ethylamino-1,3,5-triazine
3Y9 □	tris-(2,4-dichlorophenoxyethyl)phosphite

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